TECHNOLOGY DEPT.

Gas Journal

VOL. 279 106TH YEAR. LONDON, SEPTEMBER 29, 1954 NO. 4765. PRICE 1/3

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DETROIT

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FOLDAWAY EYE LEVEL GRILL

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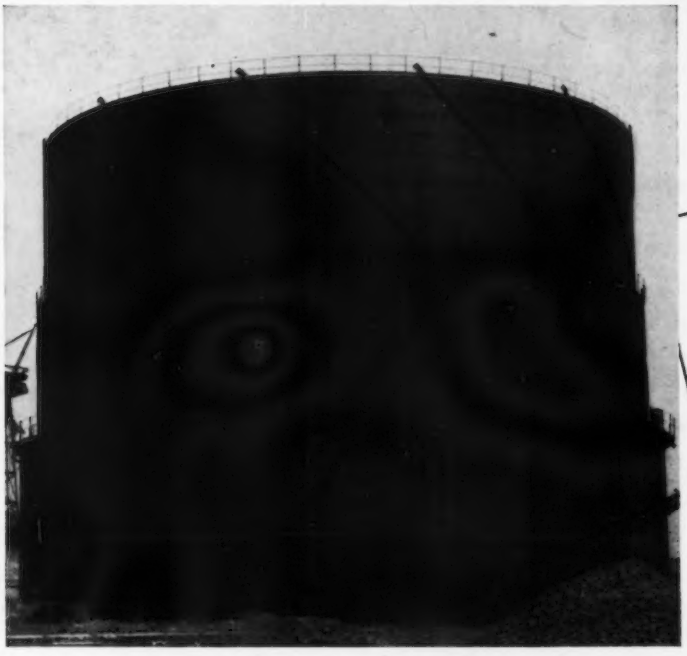

Photograph by courtesy of Bairds & Scottish Steel Ltd. (Gartsherrie Works)

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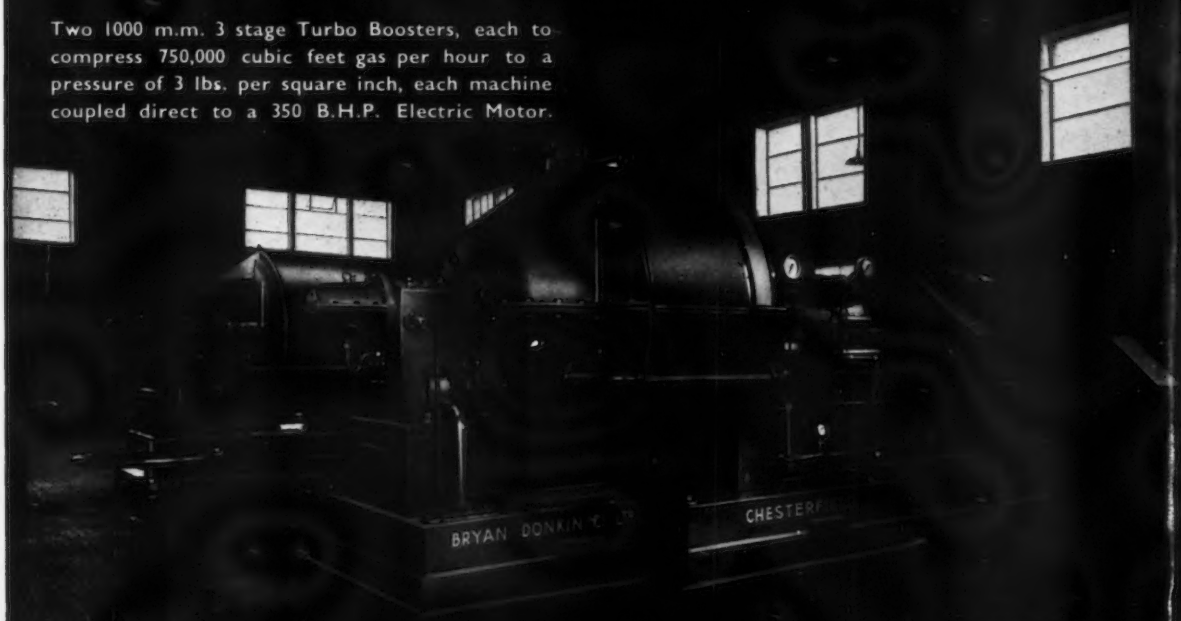

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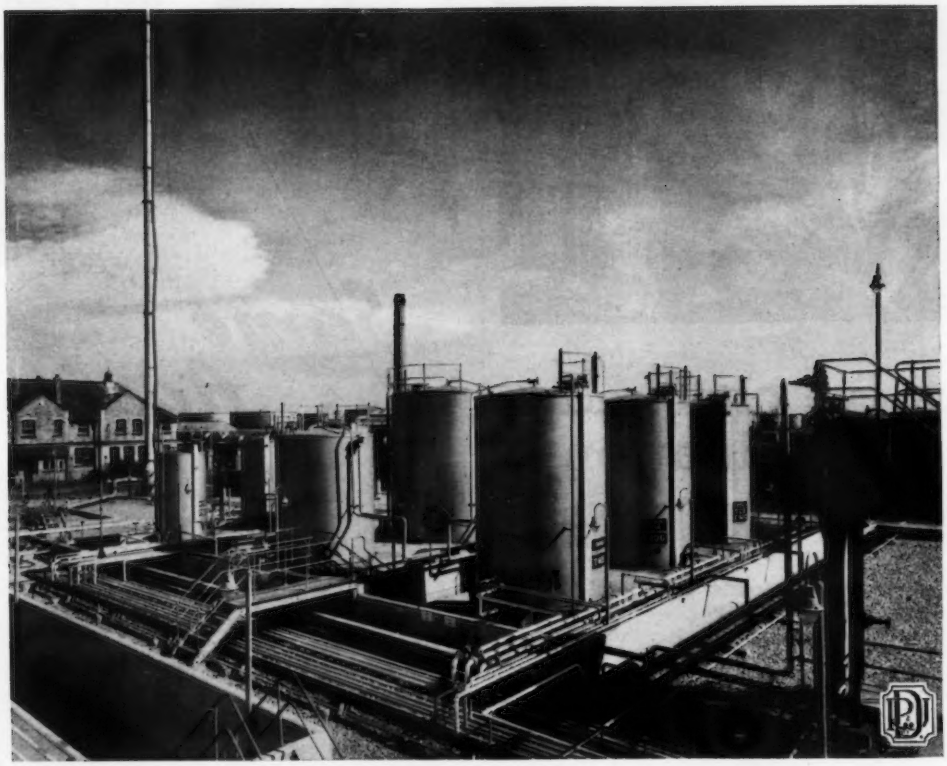

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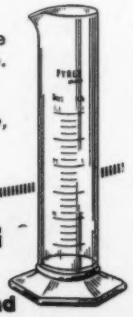

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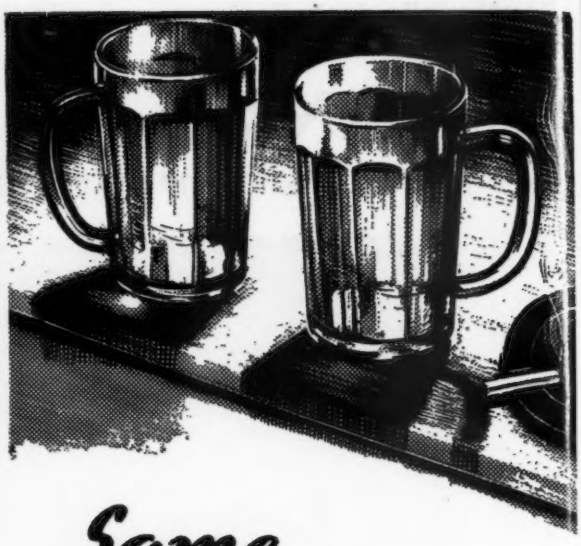

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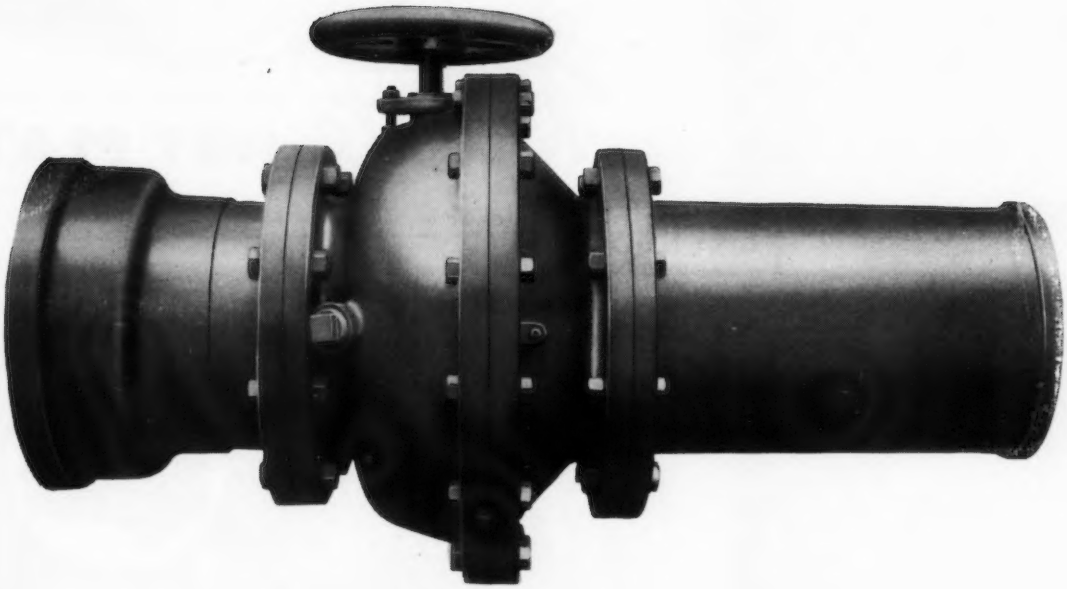

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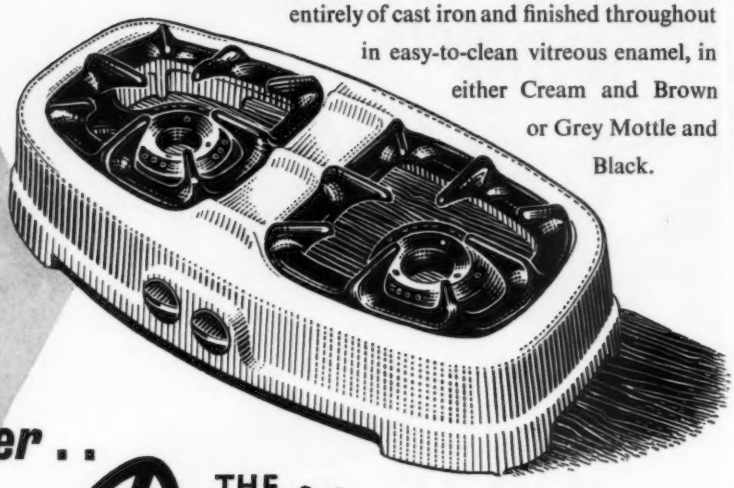

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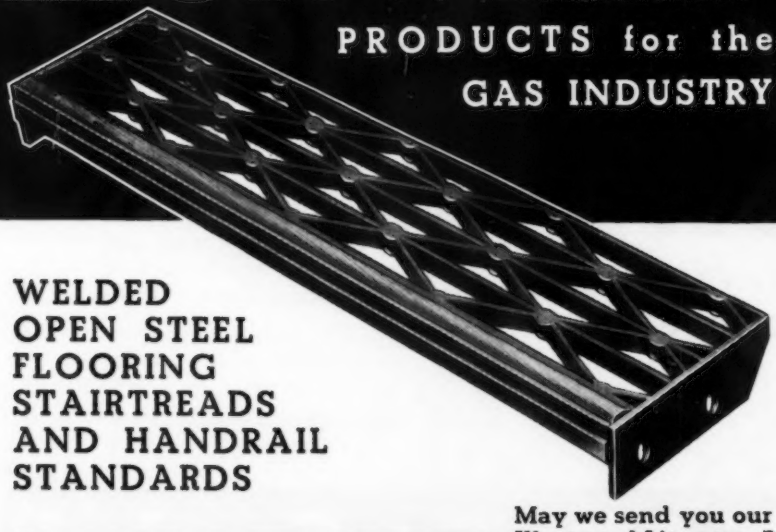

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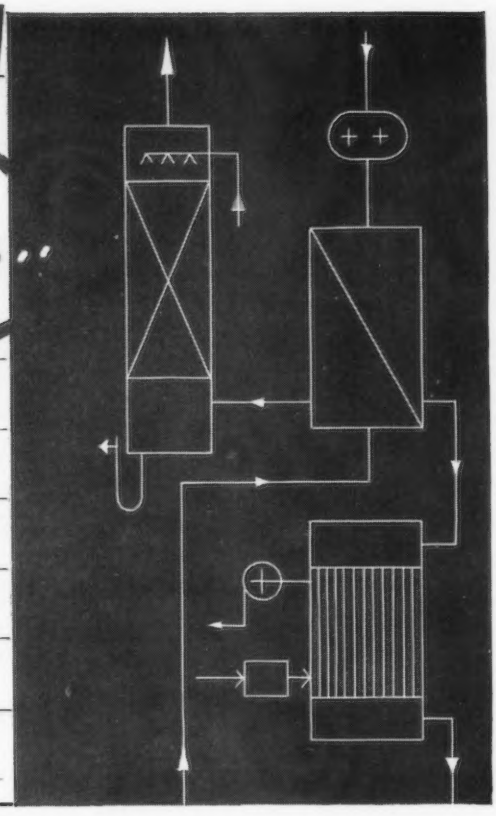

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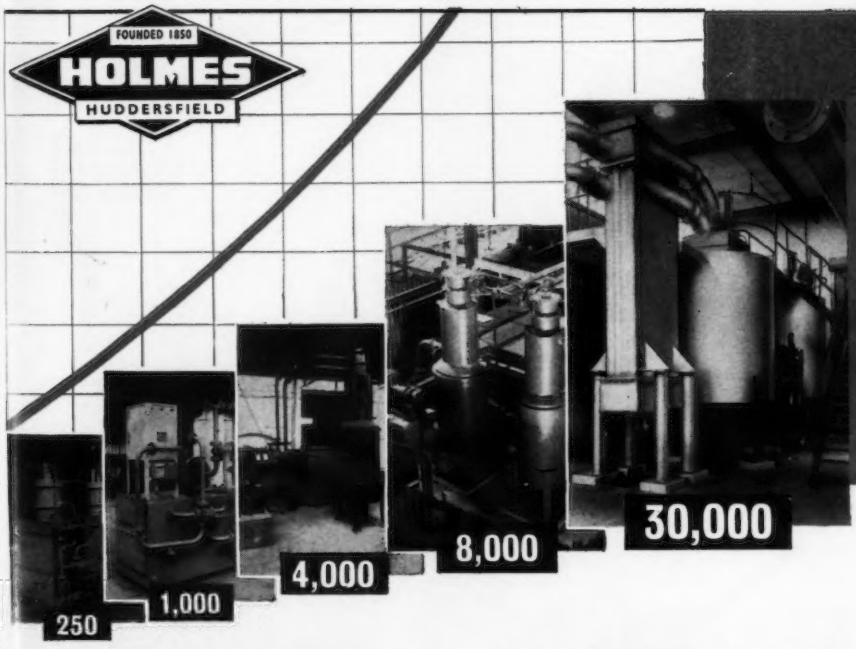

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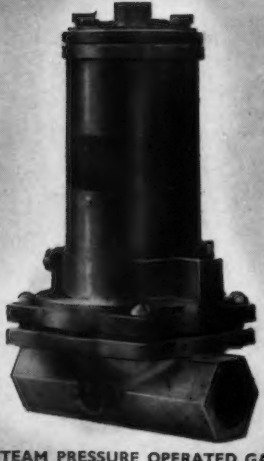

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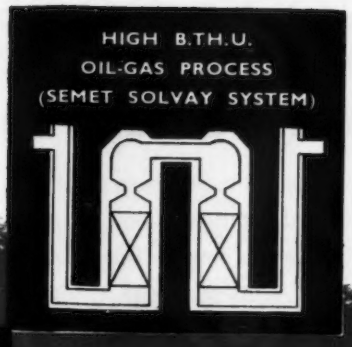

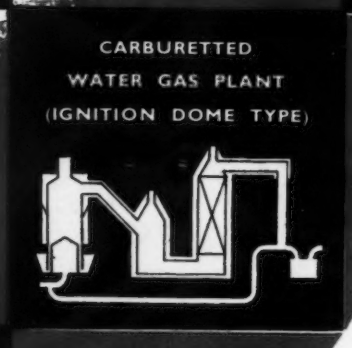

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REMOTE CONTROL

makes gas distribution a one man job!

The district stations in the Southern Group of the Central Division, Southern Gas Board, are remotely controlled from a room at Aldershot. The remote control scheme has been designed jointly by Automatic Telephone & Electric Co. Ltd., who supplied the remote control equipment, and the Bryan Donkin Co. Ltd., who supplied the governors, valves, compressors etc. By means of a single pair of telephone wires to each district station, or to two district stations on a party line basis, e.g., Bordon and Alton, this equipment provides all the following facilities:

(*a*) Remote indication of pressure at inlet to volumetric governor.

(*b*) Remote indication of flow through volumetric governor into station.

(*c*) Remote control of flow into station.

(*d*) Remote indication of gasholder stocks, with audible and visible alarms for high and low limits.

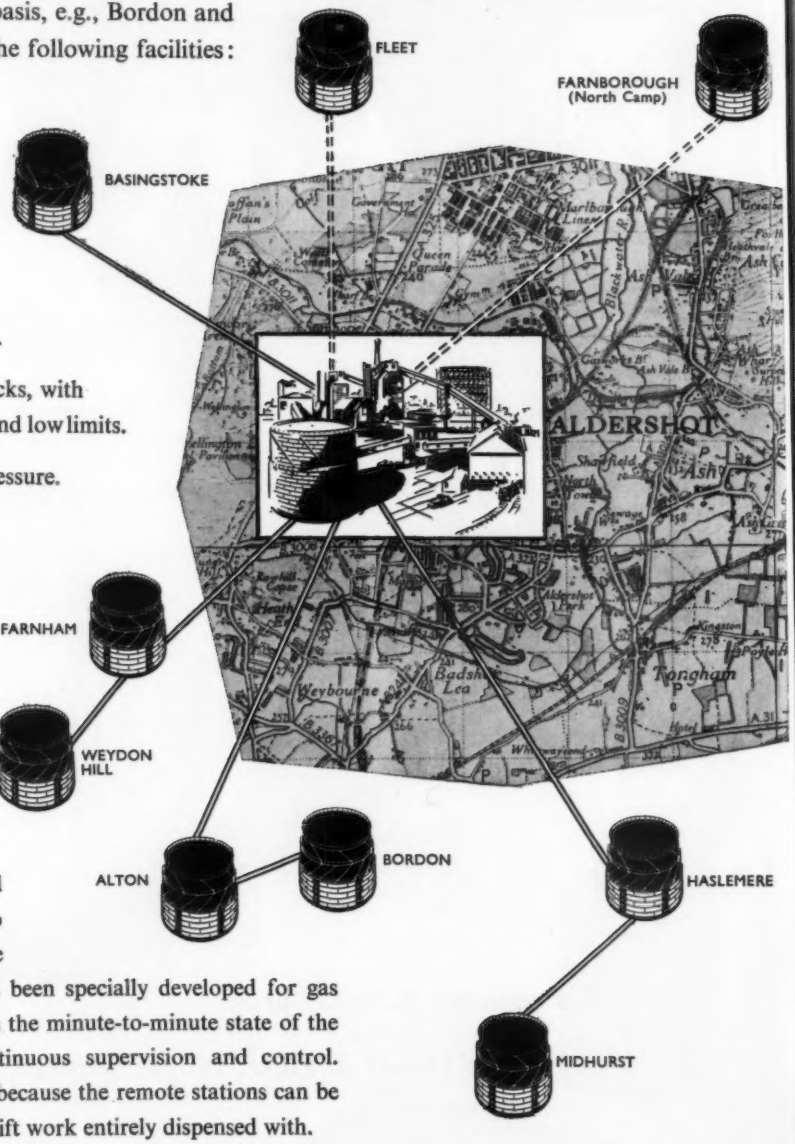
(*e*) Remote indication of the district pressure.

(*f*) Remote control (start/stop) and indication (running/stopped) of the station booster.

(*g*) Remote indication and alarm of electricity supply failure.

(*h*) Equipment testing facilities.

(*i*) Telephone communication.



Supervisory Remote Indication and Control Equipment can be applied to interlinked schemes of any size. The equipment employed at Aldershot has been specially developed for gas distribution control and its use enables the minute-to-minute state of the distribution system to be under continuous supervision and control. Saving of man-power is considerable, because the remote stations can be left unattended for long periods and shift work entirely dispensed with.

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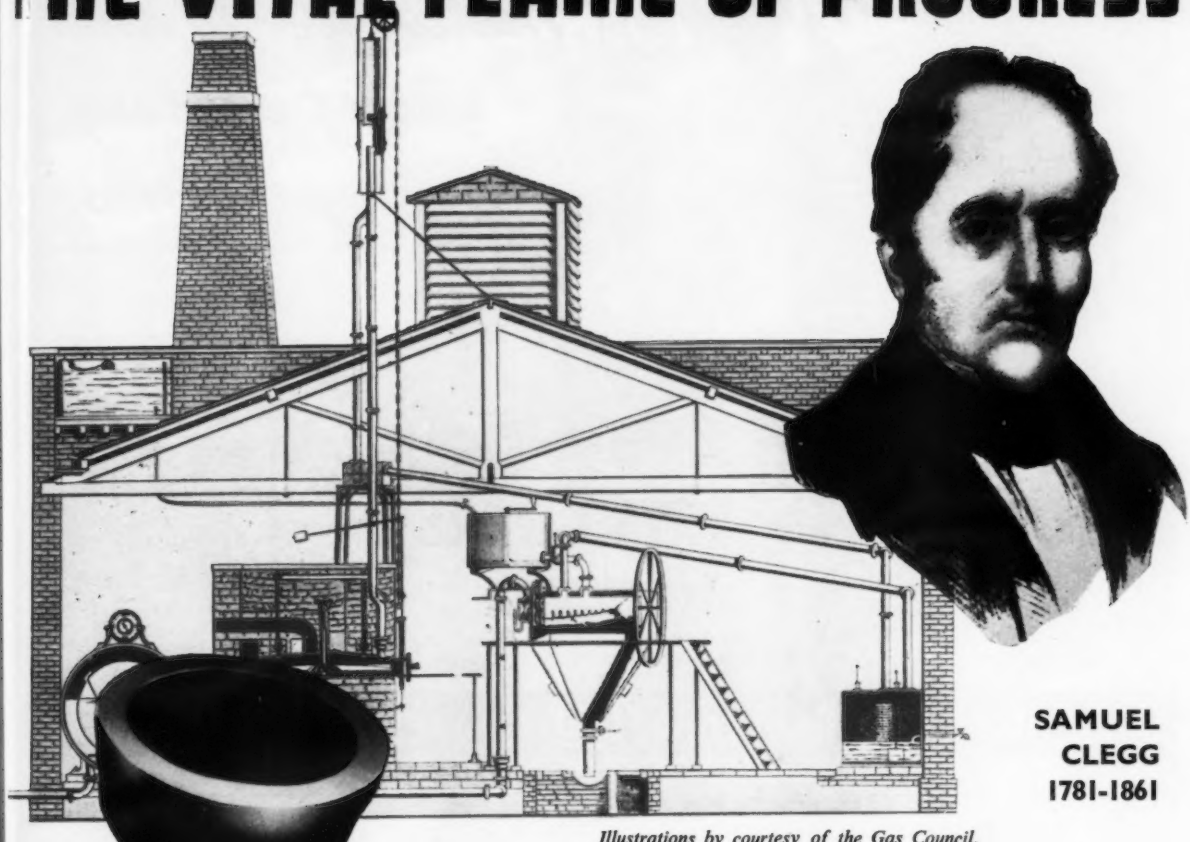

SAMUEL CLEGG 1781-1861

Illustrations by courtesy of the Gas Council.

A Mancunian, born in 1781, played an important part in the engineering of early gas plants and particularly in the purification of gas before distribution.

For many years Staveley pipes have been recognised the world over as of the highest attainable standard for Gas Mains.

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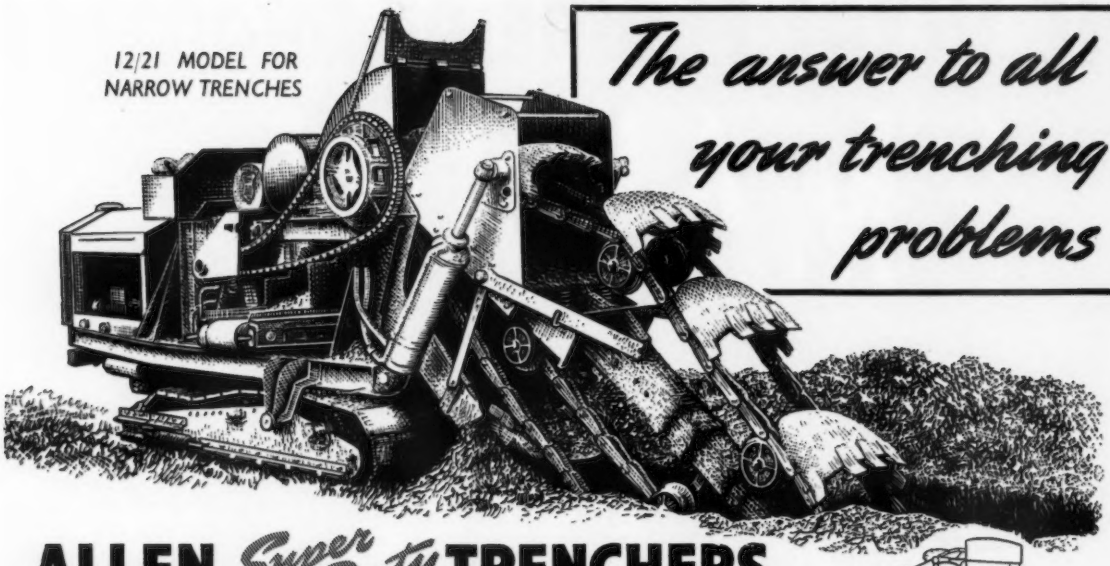

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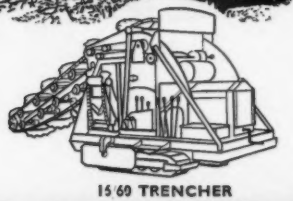

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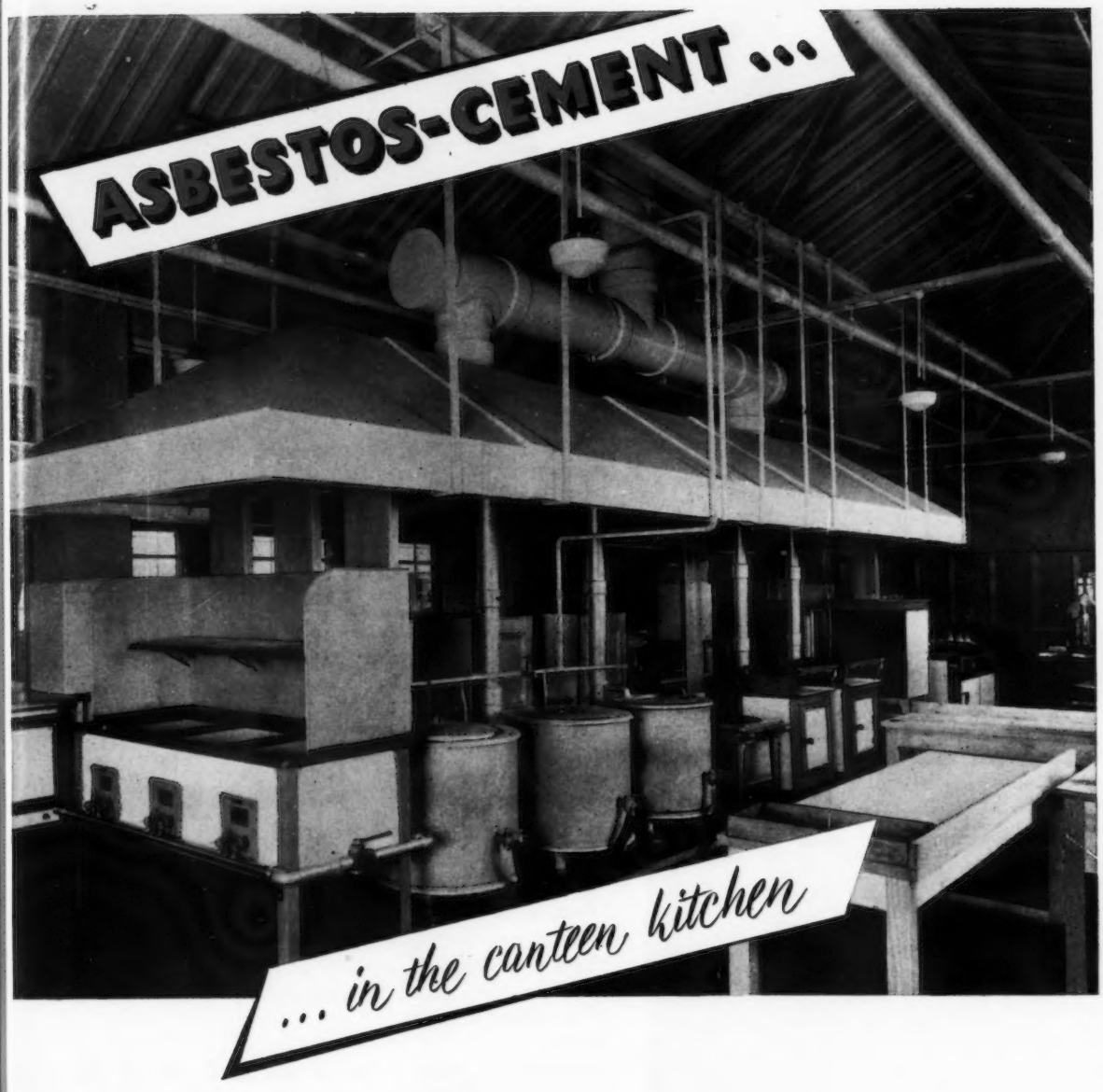

The above photograph illustrates the use of "Everite" Asbestos-Cement Flue Piping (Heavy Quality) and an "Everite" Asbestos-Cement canopy in a modern canteen kitchen.

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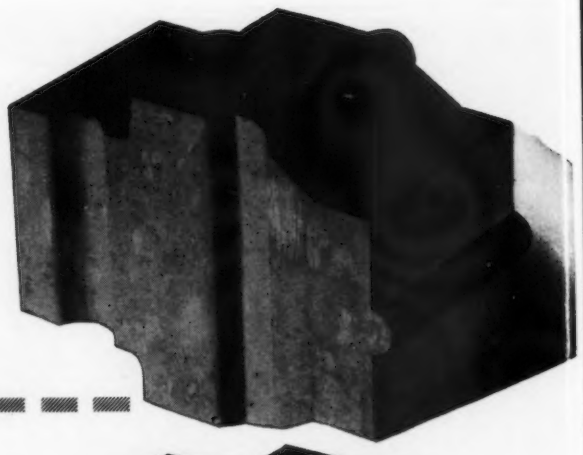
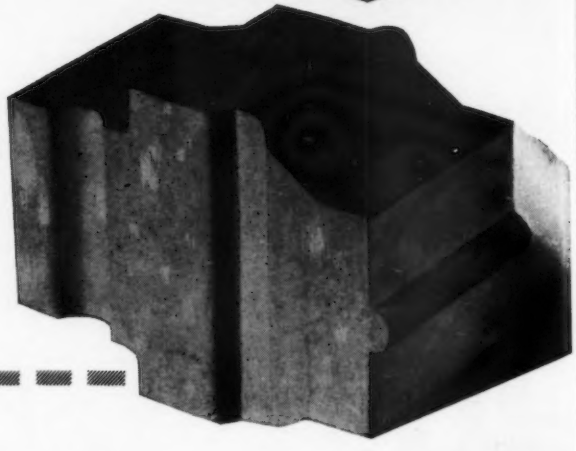
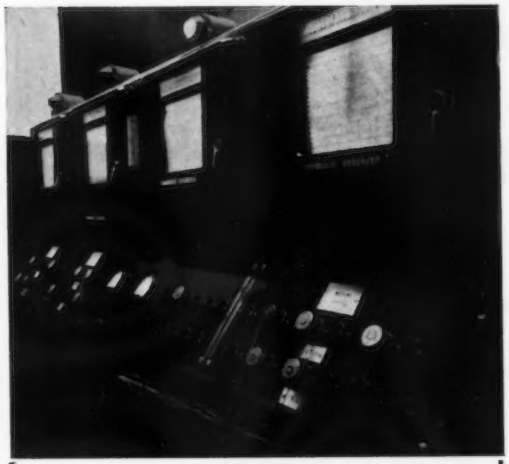


The same as This ?





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But if you specify West Hunwick **Controlled** Refractories **then** you can be certain of unvarying consistency. Brick number one cannot be distinguished from brick number one-million-and-one!

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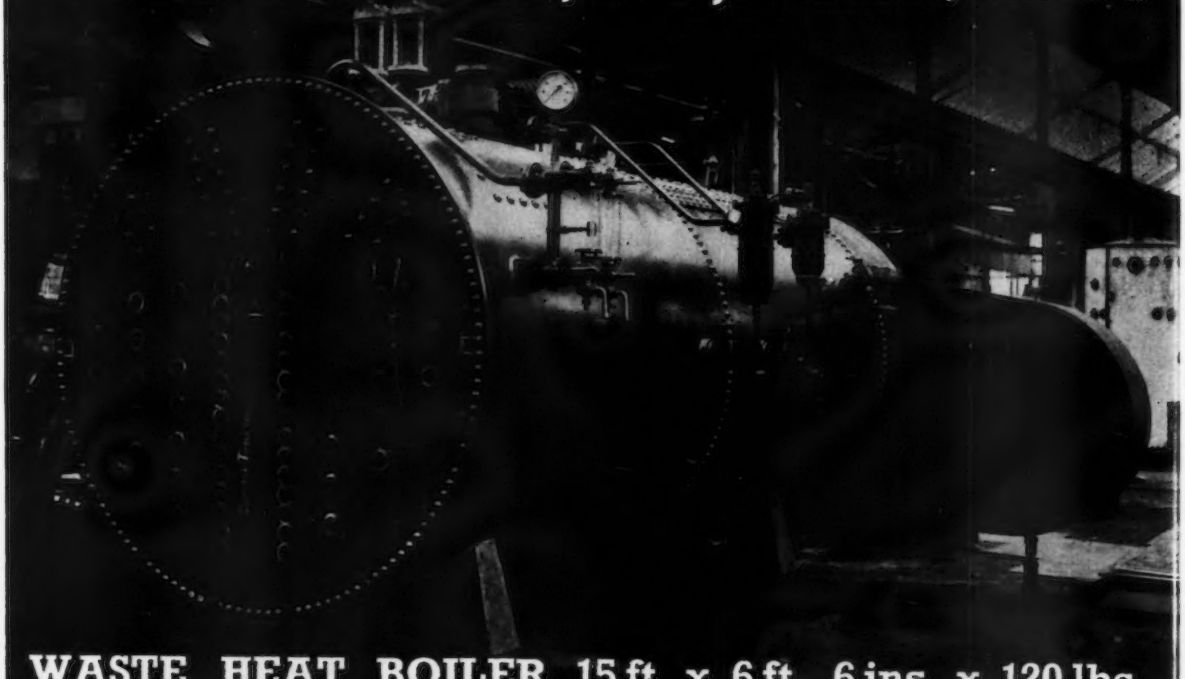
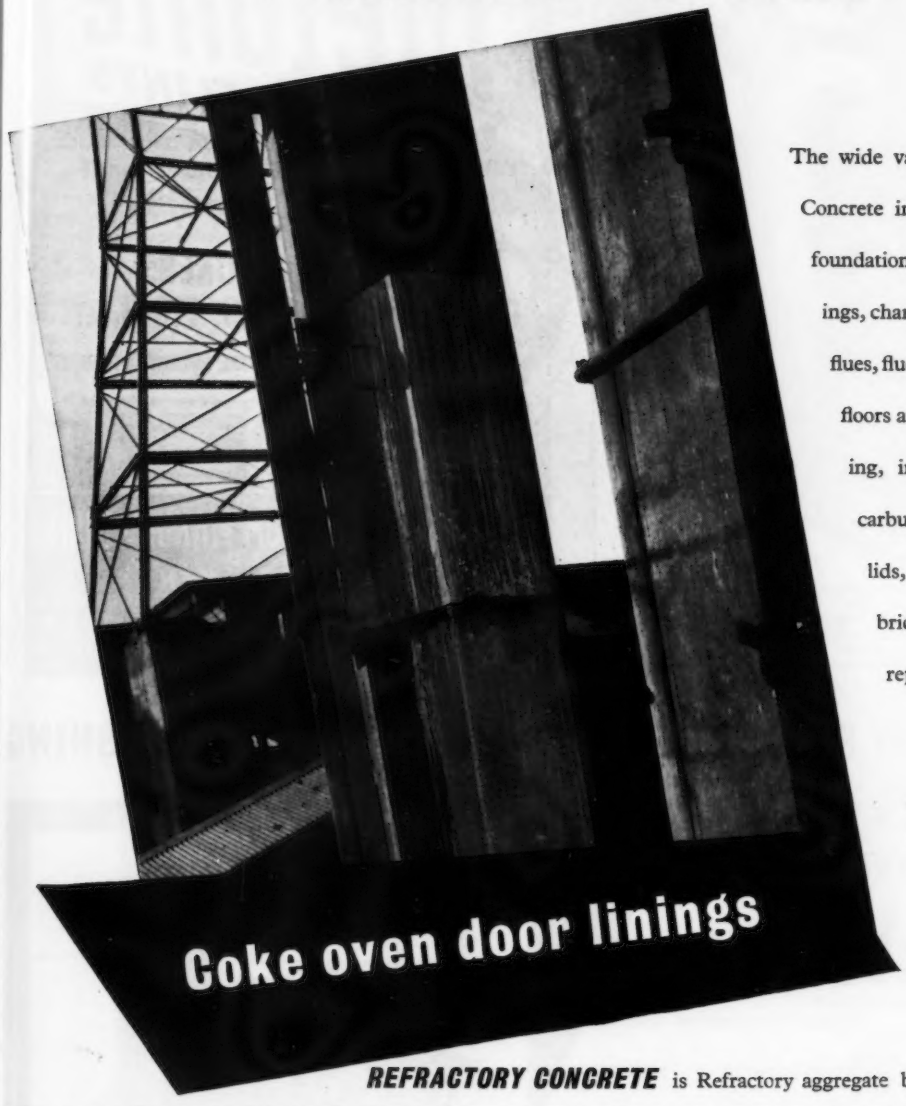


WASTE HEAT BOILER 15 ft. x 6 ft. 6 ins. x 120 lbs.
FOR YORKSHIRE GAS WORKS

Gas works engineers have many uses for REFRACTORY CONCRETE



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Photograph by courtesy of South Eastern Gas Board, East Greenwich.

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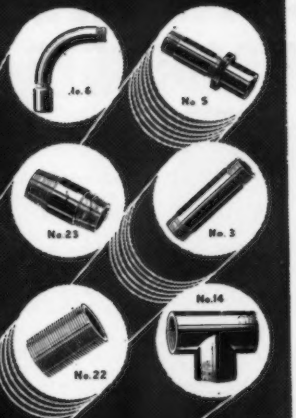

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FIG. 514

FIG. 510

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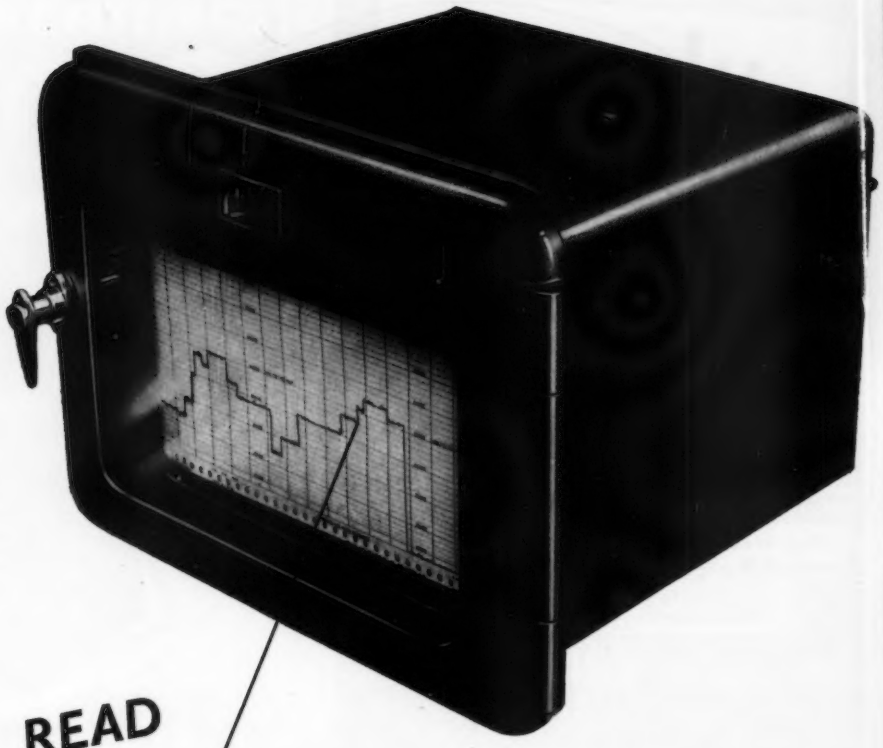

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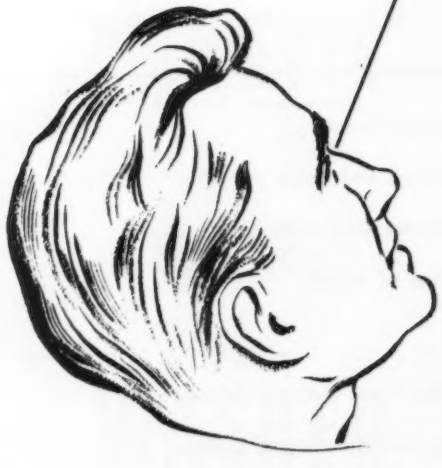

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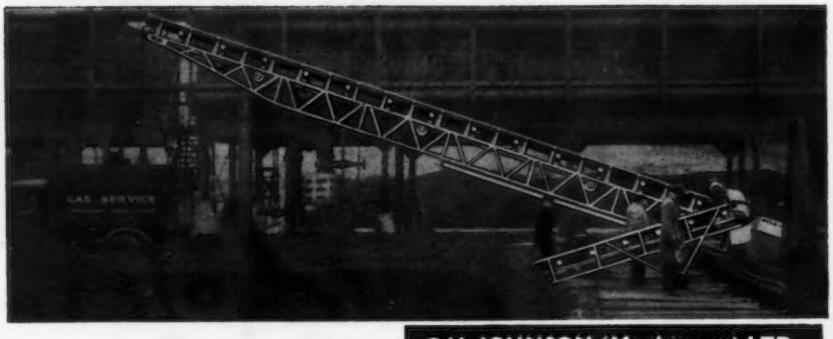

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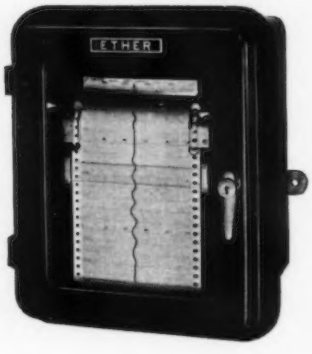

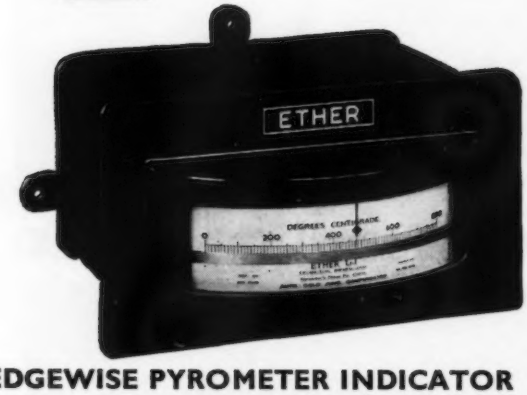

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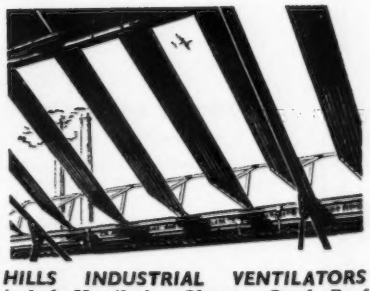

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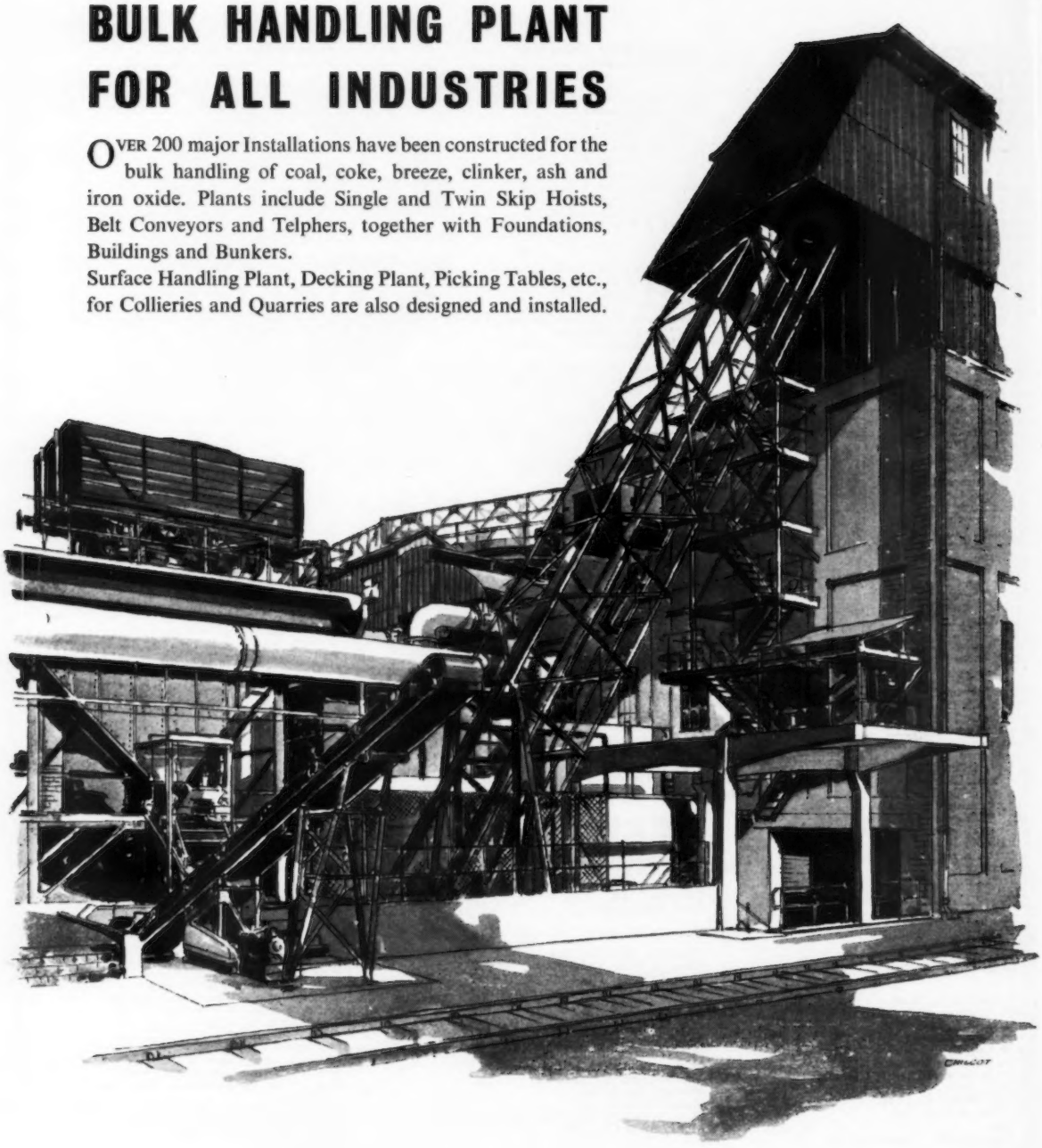

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Gas Journal

VOL. 279. No. 4765 106TH YEAR September 29, 1954

CARBONISATION OF SCOTTISH COALS

The paper which Mr. C. A. Poulson, of West's Gas Improvement Company, presented to the Scottish Association of Gas Managers—a treatise dealing with developments in the distillation of Scottish coals—may be divided into three parts. The first is an analysis, based on cumulative experience of the carbonisation of Scottish coals in continuous vertical retorts since the inception of the system. The second is a discussion on the 'carrier gas' technique (with, either surprisingly or understandably as the spirit moves, no reference to the work of the North Western Gas Board on the 'Rochdale' process). The third is a glimpse of a new development, introduced by West's, in the distillation of lower-grade coals by radiant heat. We may say at once that the paper as a whole, with its carefully drawn conclusions and with its close reasoning and its clarity of statement, is of much more than transient value. Once more it focusses attention on the flexibility of the gas-making process, with emphasis on the need for enlarging its scope to deal with a wider range of coals.

As its title indicates, the paper has special reference to conditions in Scotland, though the line of thought threaded through the argument does in fact extend well beyond the confines of that country. Of the three sections we have mentioned, however, the first specifically relates to the carbonisation of Scottish coals in continuous vertical retorts—and what a vast amount of first-class experimental work and meticulous investigation has been carried out in this regard! This section has the simple but pregnant statement that in future years the Scottish gas industry will have to process an increasing quantity of weakly coking coals as the new mining projects of Fife develop and as the 'doomed pits' in Western Scotland go out of production. For the gas industry, it will indeed be unfortunate if the coalfields of Lanarkshire are abandoned; it is to Lanarkshire that the industry has looked for its best coking coals. Moreover, the gas-making coals of Fife have deteriorated. However, the author draws consolation from his contention that the continuous vertical retort is the most efficient means for the production of town gas from Scottish coals in general. 'Capital cost of vertical retorts is lower because carbonising plant capacities are higher with Scottish coals . . . and the very reactive coke produced permits high steaming conversion. 'But the fact remains that, as the prices of coal, labour, and freight rise, increased plant production and efficiency must be obtained and improved processes evolved. In regard to plant efficiency, much can be accomplished by reduction in producer fuel requirements and by decreasing the amount of excess steam to the retorts. And in regard to current practice in Scotland, the author produces a mass of data building up to his conviction that, when using Scottish coals, the cheapest therm ex retort house, which also gives the cheapest therm under service conditions, results from making gas at a calorific value of 425 B.Th.U. per cu.ft.

We turn to the second section of the paper—the 'carrier gas' technique in continuous vertical retorts, which the author traces back to 1917, when John West patented a process for admitting 'stripped' gas at the base of the retort, by which means it was found that an increased coal tonnage could be processed in a given unit of plant and that coals of wider range could be treated. Capital costs today demand maximum gas output from carbonising plant. Obviously increased output from existing plant and the treatment of a wider range of coals are of current importance. We have published at length the results of recent work on the subject by the North Western Gas Board, and it is evident that high hopes are entertained concerning its influence on the economics of gas-making when the process is extended. Mr. Poulson summarises the advantages envisaged—and to date the advantages seem to have been proved in the North West—and we have no need to reiterate them here. In the paper the results are set out of tests on Scottish coals, from which tests, in the author's words, 'it will be acknowledged that the use of "carrier gas" in existing plant can provide considerable advantages in several directions, particularly in respect of increased production and the maximum employment of much capital invested in the industry.' To this there are two addenda: That, in the first place, due weight must be given to local circumstances and the particular factors bearing on the adoption of the process. Secondly, that to obtain the

best results from the 'carrier gas' process it is desirable that a plant should be designed specifically to embody the technique and all that it implies.

As we have mentioned, the third section glimpsed a new development in carbonisation—a process to deal, on unconventional lines, with weakly swelling coals. In this process coal is carbonised by exposure to heat radiated from a surface arranged over the top of a thin layer of coal. A clear description of the method is given by Mr. Poulson, and an important feature—once more exemplifying flexibility—is that the apparatus can be adapted to coals which are readily carbonised in one stage, to weakly coking coals which require briquetting to produce satisfactory coke, or to coals which do not require briquetting. 'It will be seen,' commented the author, 'that such apparatus would be particularly useful in the production of coke from weakly coking or non-coking coals and to control the density and strength of the coke produced from any type of coal.' Whatever the outcome of this plant in large scale operation—and Mr. Poulson admits readily enough that problems relating to such full scale working remain to be investigated—it is a wholly encouraging indication of the 'awareness' of the manufacturers of gas-making plant to likely changes in the supply of basic raw material for the gas industry, and their enterprise in anticipating requirements. Widespread interest will meet this new development.

TULLY PLANT DEVELOPMENTS

During the past decade there have been many changes of thought in the gas industry. Since the war the whole economic picture of gas-making has undergone modification as a result of the continuous and heavy increases in the cost of coal and the growing realisation that if the industry is to go forward as it should it will have to deal with types of coal covering a much wider range. The future will undoubtedly see further alteration in outlook regarding the types of gas-making plant it will be desirable to install to meet the particular needs of districts varying widely in character. In brief, there is bound to be greater flexibility of approach. All this makes more interesting and significant the paper which Mr. J. E. Tully presented at the annual meeting of the Irish Gas Association. It is a very helpful contribution setting out the development of the Tully complete gasification process to a stage where in certain circumstances it meets smoothly the requirements of efficient and economical gas-making.

The Tully system of today traces back to the methane-hydrogen plant of 1898. Arising out of the national shortages resulting from the 1914-18 war, the process came into popular favour between 1918 and 1921, during which period some 150 Tully complete gasification plants were erected in the British Isles. Since the introduction of the process, plants to the extent of 400 mill. cu.ft. per day have been constructed, of which 20 mill. cu.ft. per day represents recent installations. Following the 'boom' installation years 1918-21 developments took place over the years as outlined by the author. There was, however, no sensational advance in the application of the process. During the second world war the field of application was to a certain extent widened; but it is to the post-1945 period that we would call attention. Developments since the war have been based on the economies to be effected, with ruling market prices of oil and coke, by employing carburetted complete gasification plants. And of the greatest interest are the recent modifications in the design of the Tully complete gasification generator and the Tully system of carburetted complete gasification to enable a wider variety of coals to be used. Hitherto the process has been limited to non-coking—*i.e.*, Class 300 type—coals. The new developments referred to by the author permit the use of coals of Class types 700, 800, and 900. This, of course, is a highly important factor and at once raises the potentialities of the system, for coals suitable for complete gasification by the process are available throughout the British Isles.

The underlying theme of the paper is the flexibility of the Tully plant as it exists today. The author describes various systems of plant and methods of working whereby, according to the degree of oil carburetting, gas of any desired calorific value from 340 to 500 B.Th.U. can be manufactured. He explains how the plant can be designed for base load working either as a straight complete gasification unit for dilution purposes or as a carburetted complete gasification unit for town gas supply. And again with the emphasis on flexibility, it is pointed out that plants can be constructed for outputs as small as 2,000 cu.ft. per hour up to 5 mill. cu.ft. per day. The figures of cost of gas production form by no means the least interesting feature of this most practical paper.

WHERE SHALL WE STORE THE COKE?

Coke, we are agreed, has many excellent qualities: It is light; it is clean; it is efficient; it is comparatively cheap. But—and it is a big but—it is extraordinarily bulky, taking up twice as much space as, for example, anthracite. For many people, notably flat-dwellers, this is a great deterrent since it means that their ability to store is seriously handicapped, and in these days of uncertain supply they may decide to favour a heavier and more readily stored fuel. The fuel storage problem is therefore the gas industry's problem, and it behoves the coke salesman to be in a position to offer sound advice to customers on how to make the most of what space they have available, and to try and influence local authorities and private builders to make the necessary provision for adequate fuel storage. The plaintive cry of 'Where shall we store the coke?' must be answered. A large part of the answer is provided by a new C.U.C. booklet 'Fuel Stores for Houses and Flats' (2s. 6d. from the Council).

The Council believes that people living in flats, although their homes may be several storeys above ground level, are no different from those who live in ordinary houses and have a similar preference for open fires and plenty of cheap hot water. Many flat-dwellers, however, experience difficulty in the delivery and storage of solid fuel, for despite official recommendations that flats exceeding three storeys in height should be equipped with lifts, many have been and continue to be built without them. Where this is the case the Coal Utilisation Council recommends that the London County Council practice of providing coal hoists should be universally adopted.

It is common practice to site the fuel store inside the flat, which has the disadvantage that the coalman must enter the flat to replenish the store. Wherever possible, says the booklet, the fuel store should be placed on a balcony or landing external to the flat itself. If it must be accommodated within the flat, an external chute should be provided and the store itself strongly constructed and well-lined to prevent the escape of dust into the living quarters.

Personal Notes

MR. FRANK E. PRICE, F.S.A.A. (of Arthur Collins and Co.), a member of the Wales Gas Board, has been appointed by the Directors of the the Royal Exchange Assurance Co. as a local Director attached to its Bristol branch.

MR. FRAS. C. BRIGGS, who was formerly Divisional General Manager at Dudley, in a talk on 'My Job,' described the manufacture of gas to Sidmouth Rotary Club, of which he is a member. The talk was illustrated by a film which Mr. Briggs himself had taken. Mr. J. O. Branson, South Western Gas Board officer at Sidmouth, thanked Mr. Briggs.

MR. C. F. JACKSON, Assistant General Manager at the Willesden works of Lancashire Dynamo and Crypto, Ltd., has been appointed General Manager at that works. He joined L.D.C. in 1941 having previously been works manager of Crypton Equipment, Ltd., an associated company. During the war Mr. Jackson conducted a series of lectures for business executives in production planning and industrial administration at technical colleges.

MR. CLIFFORD E. HAMLYN has been appointed by the Bryan Donkin Co., Ltd., as District Engineer in the northern district, which includes Lancashire and Yorkshire, and will assist MR. T. W. AIKEN, Chief District Engineer, in that area. Mr. Hamlyn, who has been trained in the company's works and drawing offices, and has been a service engineer for the past three years, is the son of MR. E. G. HAMLYN, who retired 12 months ago after 52 years service, mostly as district engineer in the Northern area. The appointment arises from the fact that MR. F. D. BRADSHAW, who has been Mr. Aiken's assistant, resident in the Manchester area, is going to Canada to open a branch office in Toronto.

MR. GERALD ARTHUR OATLEY, son of Mr. and Mrs. A. F. Oatley, Wilton Lodge, Tettenhall, Staffs. (Chairman, Cannon Holdings, Ltd.) was married on September 18 at Grappenhall Parish Church, near Warrington, to Miss

Kathleen Amy Knight, daughter of Mr. and Mrs. Richard Knight, Lymm, Cheshire (Managing Director, Stoves Limited, Rainhill). The uniting of these two well known families was a unique occasion in the annals of the gas industry, and many notabilities from the industry were present at the reception, held at Mere Golf and Country Club.

MR. CHARLES COOPER, of W. C. Holmes & Co., Ltd., is travelling to Canada and United States on October 7, and expects to be away for at least two months. The latter part of the time will be spent on holiday in Bermuda and possibly elsewhere.

SIR ROBERT NIMMO, of Perth, has been appointed by the Minister of Fuel and Power to be Chairman of the Scottish Gas Consultative Council and, *ex-officio*, a part-time member of the Scottish Gas Board. Sir Robert Nimmo has had wide experience in Scottish local government and has been a member of a number of national committees. He is a member of the Scottish Parliamentary Boundary Commission.

MR. G. G. BUCKINGHAM has been appointed Manager of the Manchester office of Babcock & Wilcox, Ltd., in succession to the late MR. F. W. WOODFIELD, whose death was announced recently. Mr. Buckingham joined the Spearing Boiler Company in 1921 as a draughtsman. He left to join the Buell Combustion Company in 1926 and, in 1929, joined the Stirling Boiler Co., Ltd., in its drawing office, later transferring to the sales department and becoming chief assistant to Mr. S. J. Whybrow, General Manager. He was appointed to the Manchester office of Babcock & Wilcox, Ltd., in February of last year, following the absorption of the Stirling Boiler Co., Ltd.

MR. C. M. SPIELMAN, O.B.E., Managing Director of Whessoe, Ltd., since 1935, is relinquishing that position from the end of September and is succeeded by MR. A. G. GRANT, M.SC., Director and General Manager of the Company. Mr. Spielman is retaining his seat on the Board. Mr. Spielman, who joined Whessoe in 1923 as works manager, and became a Director the following year and General Manager in 1925, can look back on his term of office with great pride and satisfaction. During the period of almost 20 years that he has been Managing Director, the history of Whessoe, Ltd., has been an unbroken record of achievement. Mr. Grant joined the Company as chemical engineer in 1930, was appointed General Manager in 1938 and became a Director in 1942. Educated at Leeds University, where he was Corbet-Woodall scholar, Mr. Grant obtained a first-class Honours degree in Gas Engineering. Mr. Grant was a pupil of Thomas Hardie and subsequently a junior engineer in the Gas Light and Coke Company before joining Whessoe, Ltd. For Institution of Gas Engineers papers he was awarded Bronze Medal in 1929 and H. E. Jones London Medal (joint author) in 1947. He has been Chairman of the British Chemical Plant Manufacturers' Association, member of Grand Council, Federation of British Industries, and of the Council of the British Engineers' Association. He has also served on the Councils of the Institution of Gas Engineers and the Institution of Chemical Engineers.

DR. G. E. FOXWELL, MR. B. E. A. VIGERS, and DR. W. A. MACFARLANE have been appointed additional members of the Fuel Efficiency Advisory Committee of the Ministry of Fuel and Power to advise the Minister on particular questions in the field of fuel efficiency which he may remit to them. The other members of the Committee are CAPTAIN E. W. GREGSON, R.N.R. (*Chairman*), MR. W. L. BOON, O.B.E., PROFESSOR D. M. NEWITT, and PROFESSOR R. J. SARJANT, O.B.E.

MR. G. G. WARNE, Distribution Engineer to the Portsmouth, Gosport, and Bognor Regis Gas Undertaking, has been appointed to the position of Engineer and General Manager of the Isle of Wight Gas Undertaking in succession to the late MR. J. P. HALL. He is a

Past President of the London and Southern Junior Gas Association and has been Chairman of the British Junior Gas Associations Joint Council and a member of the Council of the Institution of Gas Engineers. In educational matters he has been an active member of the southern area committees of the Institution and the Ministry of Fuel and Power. Mr. Warne will take up his duties in the Isle of Wight on Friday.

Obituary

MR. J. WALDRON SWAN, who retired from the position of Manager of the Hitchin undertaking of the Tottenham and District Gas Company at the end of the war, died on September 24 at the age of 64. He had formerly been Engineer and Manager of the Hitchin Gas Company prior to its amalgamation with the Tottenham Company in 1934. He was a Past Master of the Evening Star Lodge.

Within a Few Weeks of gas production ending at Sowerby Bridge, near Halifax, the gas charges there are to be reduced by three farthings a therm. The Sowerby Bridge district is now in Zone 2 but is to be amalgamated for administrative purposes with the Halifax district, which is in Zone 1, where the charges are lower. The gas now supplied to Sowerby Bridge comes through the grid from Tingley.

A paragraph on our 'Personal' page last week stated that the North Thames Gas Board had issued revised notices giving particulars of its district committees. The reference should, of course, have been to the North Thames Gas Consultative Council.

Scottish Association of Gas Managers

Annual Meeting at Aberdeen

Mr. Athol W. Brown, President of the Scottish Association of Gas Managers, welcomed a large company at the annual general meeting in the Cowdray Hall, Aberdeen on September 16 and at the outset introduced Lord Provost John M. Graham, of Aberdeen, who said that for a short time he had been a member of the Corporation before nationalisation but he had never been on the Gas Committee. He still recalled with some affection the comforting light of the gas mantle when he was a student and his wife still cooked with gas. Gas had faded out as a lighting medium in most homes and remembering that, along with the fact they were holding their 93rd annual meeting, one might be wrongly tempted to think that the gas industry had attained to something like antiquity. That would be injudicious and improper, because gas continued to play an important part in the country's economy and to develop new techniques and applications to modern needs. The reorganisation of industry in recent years had given them new problems to face and also new opportunities. Such a meeting, where they could pool their experiences, would promote their capacity to take advantage of these opportunities. He hoped their visit to Aberdeen would refresh and reinforce them for their tasks.

SIR ANDREW CLOW, Chairman of the Scottish Gas Board, said he was extremely glad to be at their meeting and it was a special pleasure to see such a large gathering in his native city. He had been looking with interest (he would not say with entire understanding) at the learned papers to be submitted and was interested to note that they dealt with entirely different aspects of the industry The second paper dealt with a subject of very great importance, but Mr. R. J. Gregg was not right in saying that nobody there had ever had the temerity to expound salesmanship to gas engineers. Salesmanship was a function on which they should concentrate. He noticed that Mr. Gregg referred to gas engineers and not to the management. Recently a message he had sent for the manager was sent to the gas engineer. He wished them all success in their meeting.

After-proceedings at Murcar Golf Club.

MR. GEORGE E. CURRIER, representing the Institution, said that like many of his predecessors in office, the President of the Institution, Mr. W. K. Tate, was finding the weeks were too short to accommodate all his engagements. He sympathised with him in his predicament but was pleased that this had given him the opportunity to attend another Scottish meeting. The President sent his regrets that this substitution was necessary but, as his deputy, he could not entirely agree with his sentiments. He could, however, wholeheartedly support the rest of his message—*i.e.*, to convey the Institution's greetings to the meeting, to congratulate Mr. Athol Brown on a distinguished year of office, and to wish the new President, Mr. Ford, a no less happy and successful term. He also added congratulations to Mr. Athol Brown on his new appointment in the Southern area. If he had to leave Scotland, he could not leave at a better time than at the end of his distinguished year of office.

Mrs. Athol Brown presents prizes at the bowling green.

The world owed much of its progress in many fields to the inventive genius, skill, and energy of countless Scots, who had, over the centuries, migrated to England and other 'foreign' parts, where in establishing their own fortunes they had ensured the prosperity of their adopted countries. Gas engineers the world over were indebted in particular to one migrant, who in 1777 crossed the border and made his way to Birmingham, there to begin the work which ultimately led to the establishment of the gas industry. This year they were celebrating the bi-centenary of Murdoch's birth, and it was not surprising to note that parallel ceremonies were held in Scotland and Birmingham. Sir Andrew Clow, Chairman of the Scottish Gas Board, led a commemorative ceremony at the Wallace Monument, near Stirling, where in the Hall of Heroes the former North British Association of Gas Managers installed a bust of the pioneer some 60 years ago.

While Scotland rightly claimed the honour of providing the man for the job of discovering coal gas, Birmingham was equally proud of the fact that it provided the training and the tools which enabled Murdoch to do that job. The Midlands had since striven to maintain in the industry that pride of place first established by Murdoch. At the Birmingham ceremony a chaplet from the members of the Institution was placed on the memorial tablet in the church where the pioneer was buried. On October 5 the Institution would mark the bi-centenary by a lecture to be given by Dr. Alexander Fleck, Chairman of Imperial Chemical Industries, Ltd., who had himself strong links with Scotland. More than 400 members had so far indicated their intention to be present, and it promised to be an event of considerable importance.

Mr. Athol Brown's address at the Spring Meeting of the Scottish Associa-

tion was read with interest and widely commented on. He found a particular interest in his comments on a national fuel policy. From recent pronouncements it appeared that consumers were not to be subjected to any directives as to the fuel they should use. The gas industry, however, had to accept many directives. It was directed to use imported coals, and it had to find methods of using low rank coals, while those coals which it could use to the best advantage were sold abroad. The most significant of all the instructions they received was that which obliged the industry to make increasing use of oil.

The National Coal Board might consider the position of the coal mining industry in the United States. Over there the development of the oil industry, and the rapid expansion of natural gas distribution, had made it increasingly difficult for the colliery owners to find markets for all the coal they could produce. The production of coal gas, for example, fell from 171.3 mill. therms in 1932 to 15.4 mill. therms in 1951. The gas industry in this country used more than 27 mill. tons of coal per annum, but it was of necessity, turning more and more to methods of producing gas from materials other than coal. Several new gasmaking processes were under investigation. His own Board (the North Eastern) had recently put into successful operation at York a plant for the catalytic gasification of heavy fuel oil.

The exploration for natural gas continued in several parts of the country and, at the request of the Gas Council, the Institution of Gas Engineers had established panels of experts to consider various problems connected with the distribution and utilisation of natural gas. In the United States they were attempting to extend the distribution of natural gas still further by liquefying the gas and transporting it in sea-going tankers. All these trends were in the direction of a reduced consumption of coal for carbonisation and, indeed, might well affect the use of coal by other large consumers.

The post-war days of easy business were now long past, and competition was becoming keener every day. The area boards, not least the Scottish Board, had made remarkable progress since nationalisation, but the continuance of that progress, even the maintenance of their position, would depend more and more on the joint and several efforts of every employee. They must always ensure that the principles of industry and frugality regulated their daily labours.

Life Membership

It was unanimously agreed to adopt the Council's proposal to confer life membership on Messrs. H. A. Aitken (Buckhaven and Leven), R. Simpson (Denny) and J. Beveridge (Troon).

The PRESIDENT intimated that the J. W. McLusky Award, for the best paper submitted during the past three years, had been won by Mr. G. E. H. Keillor (Airdrie).

It was agreed to admit the following to membership:—Thomas Grieve (Divisional Production Engineer, Lanarkshire Division); Peter T. Jamieson (District Manager, Turriff); James Macmillan (District Manager, Auchinleck); and William S. Petrie (District Manager, Lerwick).

Reference was made to the recent death of Colonel Alan Stein, members being upstanding in his memory.

The PRESIDENT intimated that Mr. John Ford (Inverness) would succeed him, and that Mr. W. M. Gledhill, Stirling, had been elected Junior Vice-President. Messrs. W. S. Johnston (Dundee) and G. E. H. Keillor (Airdrie) had been elected to fill Council vacancies.

The PRESIDENT said that in leaving Scotland it gave him great pleasure to have a personal friend succeeding him in the chair. Mr. Ford had been a colleague of his for three years and they all knew him. He was held in universal respect. He invested him with the chain of office and wished him all success.

Mr. FORD, taking the chair, thanked the members for the honour.

Presentation to Mr. Athol Brown

Mr. R. COWIE (Hawick) presented Mr. Brown with a memento of his term of office, the latter, acknowledging, recalling that he had joined the Association in 1942, had become Secretary in 1948, and since that date had been either Secretary or a Council member. He believed that his Association work had helped him in his career.

Mr. ALEX. MCDONALD (Harrogate) proposed an omnibus vote of thanks, Mr. W. KIRK, Greenock, the Secretary replying. It was intimated that the spring meeting of the Association would be held at Peebles on April 21 and 22, with the annual meeting at Inverness in September, 1955.

After the formal business, Mr. C. A. Poulson (West's Gas Improvement Co., Ltd.) presented his paper on 'Distillation of Scottish Coals.' Following the luncheon adjournment, Mr. R. J. Gregg, Publicity Manager, Gas Council, presented his paper entitled 'Strictly Business' (a summary of Mr. Gregg's paper was published in the 'JOURNAL' of September 22, pp. 702-704).

Golf Circle

The autumn meeting of the Golf Circle was held on September 14 in perfect weather at the Murcar Club, where as many as 80 members and visitors struggled with a difficult course and among them returned some excellent cards. The prize-winners were as follows:

Winner of Challenge Bowl and Captain's Prize: D. Beavis, 83−6=77.

Section I.—2, C. H. Angus, 90−10=80; 3, S. Bennet, 90−8=82; 4, W. C. Campbell, 91−8=83.

Section II.—1 (equal), J. B. Clay 94−15=79, A. Jamieson 95−16=79; 3, D. Mungall, 98−18=80; 4, T. Cameron, 99−18=81.

Visitors.—1, W. Wright, 81−10=71; 2 (equal), P. Holt 86−6=80, C. A. Macleod 88−8=80.

The annual meeting of the Circle was duly convened after play; the retiring Captain, Mr. Laurie Gardner, in the Chair, and Mrs. Athol Brown gracing the proceedings in order to present the prizes.

That done, the Vice-Captain, Mr. Duncan Melvin, moved a hearty vote of thanks to Mrs. Brown, and asked her to accept a travelling clock as a memento of the occasion. It would, he hoped, be a help to her in her journey south and later, perhaps, in coming north again.

Mr. Beavis then acknowledged his win and intimated that the trophy would immediately be put to its proper use; and Mr. Alistair Brown expressed the thanks of the visitors for a most enjoyable day.

The retiring Captain then announced that the unanimous recommendation of the Committee was that Mr. Duncan Melvin be elected Captain and Mr. J. D. Couper, Vice-Captain for the year 1954-55, and that the new Member of Committee be Mr. Clifford King. The recommendation was passed with acclamation, and those concerned made suitable acknowledgment.

Mr. Melvin was inducted to the chair and presented with the badge of office, and the proceedings ended with his proposing a very warm vote of thanks to Mr. Laurie Gardner.

The Ladies' Golf Circle held its annual competition for the Handley Salver and other donated prizes over the Deeside Golf Course, Aberdeen, on September 15. The prize winners were as follows:

Handley Salver and 1st Prize, Mrs. D. Burns; 2nd, Mrs. H. Milne; 3rd, Mrs. C. Pearson.

Scratch Prize: Mrs. L. Fletcher.

Bowls Competition

A large number of members and visitors attended at Woodend Bowling Green for the September meeting of the S.A.G.M. Bowling Club, which took place at Aberdeen on September 15. The Bowling Trophy was won by the following rink which was 18 shots up:—

1, J. S. Ednie, Crieff (Skip); 2, H. Fishburne, Retford; 3, J. Macmillan, Auchinleck; 4, D. Gold, Kingskettle.

Second prizes (12 shots up) were won by:—1, W. T. Gilchrist, Cowdenbeath (Skip); 2, J. Thow, Edinburgh; 3, Wm. Gray, Edinburgh; 4, E. G. Smith, Glasgow.

Mrs. Athol Brown, wife of the President of the Scottish Association of Gas Managers, presented the prizes. At the annual general meeting held in the clubhouse afterwards, Mr. J. S. Ednie (Crieff) was elected President of the Club for 1954-55.

About 250 members and visitors attended the reception at the Douglas Hotel. The annual outing on September 17 was attended by about 100, and consisted of an extremely enjoyable tour through Royal Deeside, with glimpses of Aboyne, Ballater, and other beauty spots. Luncheon was served at Braemar and the tour included a visit to the little church at Crathis, attended by the Queen and members of the Royal Family when they are in residence at Balmoral.

Pottery Making on Gas Stand

At the Brighter Homes Exhibition opened in Fenton Street Drill Hall, Leeds, on September 7, Mr. Andy Szekely, of Hungarian origin, demonstrated to fascinated onlookers the skill and craftsmanship of the potter's wheel as he fashioned clay vases and bowls by this traditional method.

His demonstration was part of a display by the North Eastern Gas Board in conjunction with Hartley's Potteries, of Castleford, to show both the old and the new aspects of pottery making. Mr. Szekely's wares were put through their finishing stages in a modern gas-fired kiln. It was the type used for research and teaching purposes and smaller than the commercial type.

Miss A. Limbert, of Castleford, was to be seen painting designs on beakers, vases, ash trays and tiles, which after being gilded or enamelled, were also baked in the kiln. The Board also have a comprehensive stand demonstrating gas appliances for the home. The exhibition was opened by Mr. Carroll Levis.

West Midlands Gas Prices Pegged

An important statement on gas prices in the West Midlands was made by the Chairman of the Board, Mr. G. le B. Diamond, at a meeting of the West Midlands Gas Consultative Council, held in Birmingham on September 20 under the chairmanship of Alderman W. H. Malcolm, Coventry. Prices are to be held at present levels at least until April 1 of next year, but additional costs amounting to £1,330,000 in a full year have to be faced.

Mr. Diamond recalled that when gas tariffs were last increased in June, 1953, a memorandum was circulated to the Consultative Council, giving particulars of the additional costs which had fallen on the Board and which amounted to over £2 mill. per annum. Coke prices were then increased in order to provide £330,000 towards these costs, leaving a balance of £1,725,000 to be found from other sources.

The Board undertook to do its best to provide approximately half of this large amount by utilising surpluses and by striving for still further operational and administrative economies, leaving less than one-half (£800,000 in fact) to be passed on to gas consumers through the revised tariffs.

In order that the Council might be brought up to date on matters affecting tariffs, three important factors needed to be considered. In the first place, it was gratifying to record that by dint of further economies the Board had been able to absorb a balance of £925,000 which otherwise would have fallen on consumers.

Since April of this year sales of gas had been 7% above those for the corresponding period last year and industrial consumers had taken 11% more. This substantial increase in gas sales had had a beneficial effect on the Board's financial position. In consequence, the Board had decided that it would hold gas prices at present levels until at least April 1 next year. Unfortunately, further additional burdens had arisen (for coal, freight and wages, etc.) which would cost the board no less than £1,330,000 in a full year, so that there was a repetition of the familiar story of improvements in the Board's internal financial position being set at nought by external factors. It would, of course, be premature to discuss at this stage the action that might eventually have to be taken to meet these burdens, but consumers were entitled to know that for the current year at least their gas bills were in the aggregate £1 mill. lighter than they otherwise would have been.

Each year since nationalisation coal and other costs had moved relentlessly upwards, and each year up to the present gas prices in the West Midlands Area had had to be increased to meet some part of these costs. If for no other reason, 1954 deserved to be placed on record as the year in which this vicious circle was broken.

The Mond gas controversy which affects a number of industrial firms in South Staffs, will be again discussed at the next meeting of the Consultative Council to be held in November. In the meantime a statement by Mr. E. Coupland showing why users of Mond gas are still dissatisfied and also a memorandum by the Board will be circulated to members of the council.

Mr. Coupland largely reiterated previous arguments put forward and suggested finally that the Council should seriously consider whether it was satisfied it had sufficient information on which to make a wise decision. If not, he said the suspicion must arise in their minds as to whether they were there merely to rubber stamp decisions already taken by the Board.

Mr. Diamond said the reiteration of the statement about closing the works was disturbing to employees and he wished to make it clear that there was no question of any redundancy arising. If Mond gas was withdrawn it would be replaced by town gas and if the necessity arose employees could be transferred to other works.

Mr. Coupland said they wanted to know why the price differential had disappeared.

Mr. Diamond said he wanted the employees to be reassured.

Alderman Malcolm: There is no question the employees will be safeguarded.

Mrs. K. Newbould (Redditch) raised the question of old or worn fittings which might be a source of danger, particularly in older types of houses inhabited by old people. There had been accidents and she thought some appliances should have a limit of time on their use particularly portable fires, so that they could be replaced at the end of a normal life.

Mr. Diamond said they all very much regretted accidents which occurred. The Board took every possible precaution in regard to their appliances but could not be responsible for those not purchased from them. They could not examine all fittings at old or other types of houses, but immediate attention was given to any notification of possible defects.

It was suggested that here the women's organisations could be of help.

Mr. Diamond said in many cases they could deal with such a matter within minutes through their radio controlled vans.

Coal Board's Price Structure

The Northern Gas Consultative Council at its meeting in Newcastle on September 6 decided to await the outcome of a meeting of the chairmen of gas consultative councils in London before taking further steps to press for the separation of gas and coking coals in the N.C.B. price structure. The Council at its last meeting expressed the opinion that the N.C.B. was following a mistaken policy in grouping gas coal with coking coal so far as prices were concerned. It was reported by Mr. E. Crowther, Chairman of the Northern Gas Board, that the Board's coal had risen by 4s. 10d. a ton compared with a national average increase on all gas coals of 3s. a ton. He contended that the price linking of gas and coking coals worked disadvantageously to the Board and thought that there might be some improvement if they were separated.

The reason for the higher prices in the Northern Gas Board's area springs from the N.C.B. quality/price formula. Durham coking coals have a high export value and are therefore valuable and expensive.

Alderman J. Hoy, Chairman of the Council stated that questions had been asked in the House of Commons on the price structure of the Coal Board and on the need to set up an investigating committee. The reply was that the Minister of Fuel did not consider an investigating committee was necessary. The Coal Board's present price policy was designed to secure a close relationship between price and quality but other important factors were also concerned. In fixing prices the Coal Board consulted the statutory bodies, namely the Industrial Coal Consumers' Council and Domestic Coal Consumers' Council.

Alderman Hoy said that the Northern Gas Board, although intensely interested in bringing about reductions, had now advised that it could do nothing further to reduce prices and the matter must now rest with the Consultative Council.

'If there is any pushing to be done in order to bring about a separation in the prices of gas and coking coals it can only be done by this Council,' added Alderman Hoy, who said that he would shortly be attending a meeting of the chairmen of gas consultative councils. One of the subjects for discussion would be the question of coal prices and their effect on the gas industry. While he could not tell what would result from the meeting he considered that the wisest course of the Council would be to defer further consideration of the issue until after that meeting.

At its previous meeting the Council decided to send a deputation to meet the Northern Group of Labour M.P.s. Alderman Hoy read a letter he had received from Mr. F. T. WILLEY, M.P. for Sunderland North, Secretary of the Group, who stated that while the Group was not averse to meeting a deputation to discuss the question it felt that the Council should exhaust its official and ordinary avenues of consultation. These included the Domestic Coal Consumers' Council and Industrial Coal Consumers' Council. If then the Council still desired to see the Group they would be happy to meet the proposed deputation.

Mr. Willey concluded: 'I should perhaps say, however, that from our preliminary examination of the problem any enquiries by the Group would not confine themselves necessarily to the question of coal prices because it appears to us that it may be that the increase in the price of coal is only one factor and not solely responsible for the increased cost placed upon the gas industry.'

Councillor Mrs. B. F. C. Adams, Vice-Chairman of the Council considered that the reply of the Northern Group of Labour M.P.s was disappointing and drew attention to the many internal economies which the Board had effected to keep down prices.

Mr. R. A. Cookson, an industrial representative on the Council, agreed that the wisest course was that suggested by the Chairman and it was agreed that the question should be deferred pending the outcome of the London meeting.

A resolution from the Carlisle and Penrith Gas Consumers' Committee urging that if no progress was reported following talks with the Northern Group of Labour M.P.s a deputation should be sent to the Ministry of Fuel was 'received.'

SITE WORK IN PROGRESS

- ● ABERDEEN
- ★ ALDERSHOT
- ▲ AVENUE (CHESTERFIELD)
- ■ BARROW BARNSLEY
- ▲ BECKTON
- ★ BIRMINGHAM, NECHELLS
- ★ BIRMINGHAM, SALTLEY
- ★ BIRMINGHAM, SWAN VILLAGE
- ★ BIRMINGHAM, WINDSOR STREET
- ★ BRIDGWATER
- ● BRIGHTON
- ★ BOLTON
- ▲ CARDIFF
- ★ CHELTENHAM
- ★ CHESTER
- ● CHRISTCHURCH, NEW ZEALAND
- ★ CLECKHEATON
- ★ CRIEFF
- ●★ CROYDON
- ●● DERBY
- ★ DONCASTER
- ● DOVER
- ● EAST COWES
- ▲ EBBW VALE
- ●● EDINBURGH
- ★ ELLESMERE PORT
- ● EXETER
- ▲ FISHBURN (DURHAM)
- ★ FORFAR
- ★ GAINSBOROUGH
- ★ GLASGOW, DAWSHOLM
- ●★ GLASGOW, PROVAN
- ●★ GLASGOW, TRADESTON
- ● GREENOCK
- ● GRIMSBY
- ★ HARROGATE
- ★ HEREFORD
- ★ HILSEA
- ★ HUDDERSFIELD
- ★ HYDE
- ★ ILKESTON
- ★ IPSWICH
- ★ KIDDERMINSTER
- ★ KILSYTH
- ★ LANARK
- ★ LANCASTER
- ★ LINCOLN
- ★ LIVERPOOL, ATHOL STREET
- ★ LIVERPOOL, GARSTON
- ★ LONDON, FULHAM
- ★ LUTON
- ■ LYSAGHT (SCUNTHORPE)
- ▲ MONKTON (DURHAM)
- ★ MONMOUTH
- ★ NEWCASTLE-UNDER-LYME
- ★★ NOTTINGHAM
- ★ OLDHAM
- ▲ ORGREAVE (SHEFFIELD)
- ★ OTLEY
- ★ PAISLEY
- ★ PENZANCE
- ★ PETERBOROUGH
- ★ PONTYPOOL
- ★ PRESCOT
- ★ RAMSGATE
- ▲ REDBOURN
- ★ REDDITCH
- ★ ROCHDALE
- ● ROTHERHAM
- ★ ROWLEY REGIS
- ★ RUGBY
- ★ SAFFRON WALDEN
- ★ SHREWSBURY
- ★ SITTINGBOURNE
- ●★ SMETHWICK
- ● SOLIHULL
- ★ STAMFORD
- ▲ STANTON
- ★ STOCKPORT
- ■ THORNCLIFFE
- ● TINGLEY
- ● TOTTENHAM
- ● WALSALL
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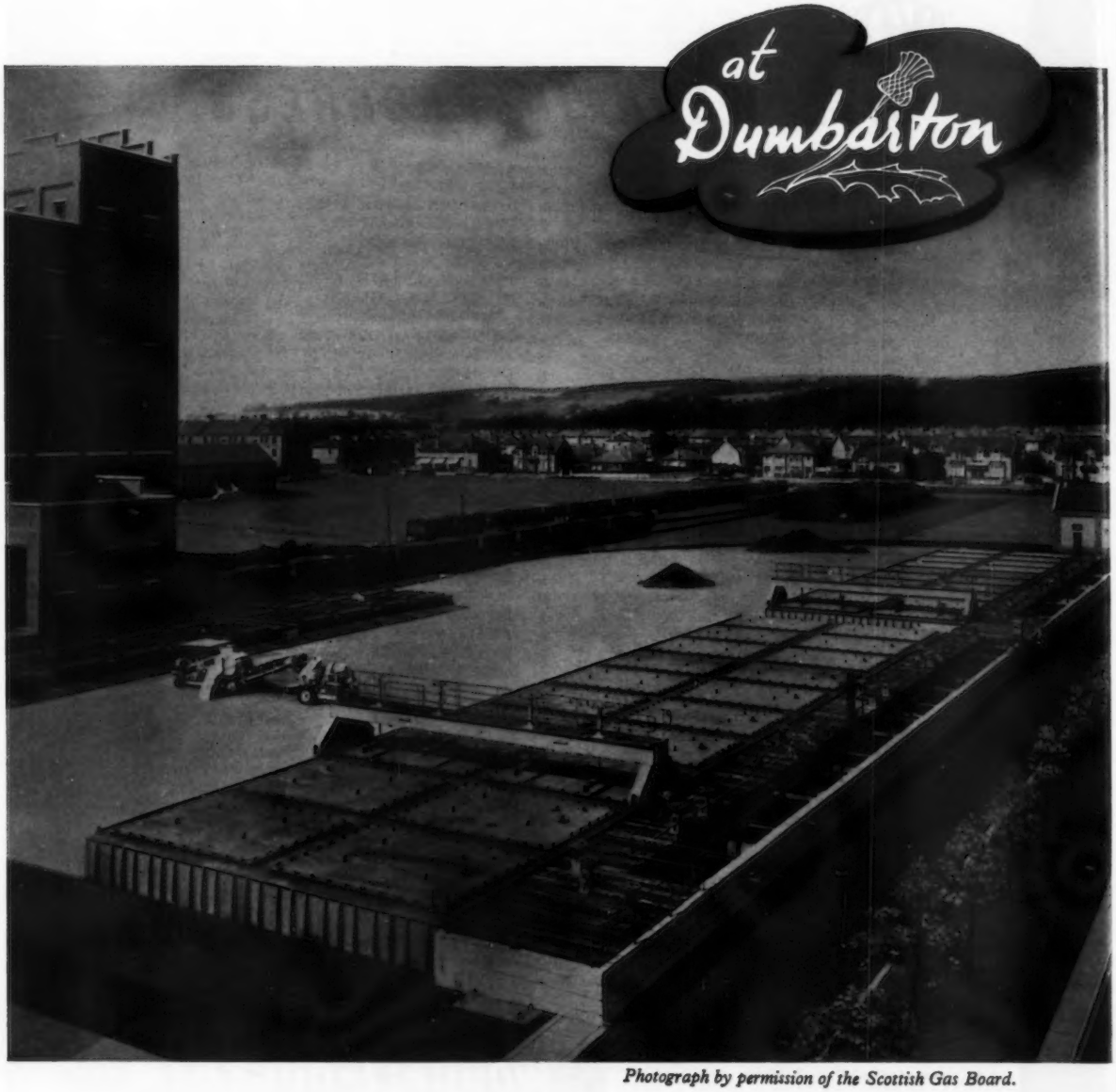

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Dumbarton Extensions Opened

History in the Making

The new gas works at Dumbarton was officially opened on September 23 in the presence of a large company by the Rt. Hon. James Stuart, M.V.O., M.C., M.P., Secretary of State for Scotland, who unveiled a plaque recording the fact that he had performed the opening ceremony. He was introduced by Sir Andrew G. Clow, K.C.S.I., C.I.E., Chairman of the Scottish Gas Board.

MR. STUART said the ceremony marked the completion of a project first planned by the Dumbarton Town Council. In view of the urgent demand for gas in the area and indeed as far away as Glasgow, the Gas Board, when it took over, decided on a bigger scheme so that the output might reach a total of 8 mill. cu.ft. per day. The constructional work was imposing and he had been told that it rivalled Dumbarton Rock in height. It was the largest constructional work which he had opened during his three years at the Scottish Office. He congratulated the Scottish Gas Board on the admirable work it was doing in 'the interests of industry and of the domestic consumer.

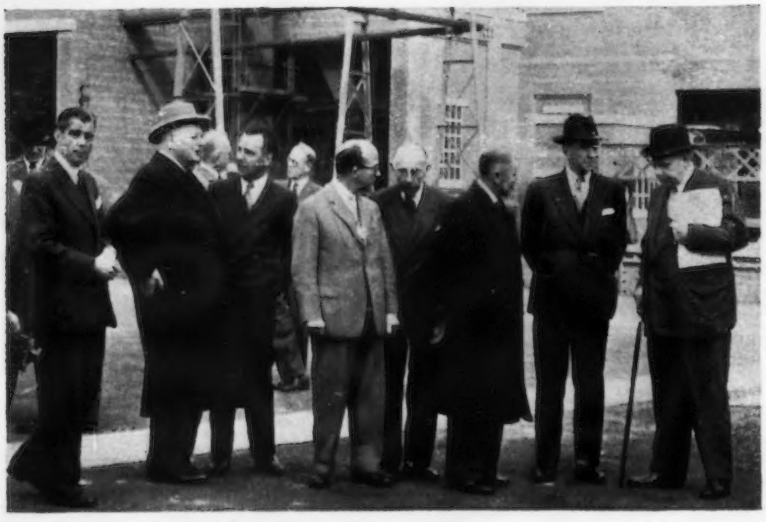
Following a tour of the works luncheon was served in the Council Chambers at Dumbarton, Sir Andrew Clow presiding.

MR. STUART, proposing the toast of the Scottish gas industry, said that one of the great Scotsmen who had helped on civilisation was William Murdoch. The Scots had furnished many benefits—telephones, television, mackintoshes, steam engines and other devices—and Murdoch created something afterwards big enough for a Government to nationalise. He had lit his house with gas in 1792, but it was not until 1812 that the first gas light company was formed, the Dumbarton Gas Light Company being formed in 1832. While it took time before an invention benefited the inventor it also took time before a Corporation would back an invention with the ratepayers' money. A public body had to think long and hard before doing so.

In modern industry brain power was more important than horse power and if the economic pattern determined that final authority should rest in a small number of hands it was essential to ensure that the right men were appointed to public corporations. In the more loosely knit economy of the 19th century—an age noted for inventions which transformed the modern world—Murdoch was bound to find a sponsor.

In Britain there were 12 gas boards, and the Scottish Gas Board was responsible for the industry in Scotland. For all practical purposes these boards were autonomous and the Chairmen were members of the Gas Council, a co-ordinating body. Much authority was left in the hands of those managing the regions. In Scotland they were fortunate in having under Sir Andrew Clow (a man of considerable administrative experience) a body of men representing both the public interest and specialised knowledge. Since its inception the Board had an impressive record in face of the difficulties marking the post-war years. Arrears of war-time maintenance had to be overtaken, shortage of materials had to be met and at the same time the needs of housing and industrial development had to be catered for. All

Addressing the gathering at the luncheon is Mr. James Stuart. On his left are Mr. D. D. Burns, O.B.E., and Sir Frederick West.



After the opening ceremony, this group touring the works includes (left to right) Mr. A. McFadyen, Manager; Sir Frederick West; Mr. Tom Steele, M.P. for Dumbarton West; Provost McLeod of Dumbarton; General Telfer Smollett, Lord Lieutenant of the county; Sir Andrew Clow and Mr. James Stuart, Secretary of State for Scotland.

the time the aim had to be kept in mind of securing a progressive and substantial increase in the efficiency of gas production.

'At the moment,' said Mr. Stuart, 'the Board is actively engaged in trying to find new ways of making gas that call for smaller quantities of high grade gas-making coals and Sir Andrew says it is actively studying the possible application in Scotland of recent developments in gas making. Three new processes are being investigated and a search for natural gas in commercial quantities is also being carried out for the industry in Scotland.'

The Board did not start from zero, but inherited from authorities all over Scotland an industry which was in many places up-to-date and efficient. This was specially so in Dumbarton where in 76 years the number of consumers rose five-fold and the quantity of gas produced 40-fold. When the Board took over the Dumbarton works it took over a concern with its own plans for development. It was an area which presented a challenge to the Board and as the number of consumers had risen and the sale of domestic appliances had increased it was clear that the Board had risen to the challenge.

In spite of substantial increases in the price of coal, rates of transport and

wages and the consequent necessary rise in the price of gas the number of consumers had continued to rise since nationalisation. The consumer was safeguarded by the Scottish Gas Consultative Council, the district committees of which saw that the Board did not forget the customer's interest. He was glad that Sir Robert Nimmo had agreed to succeed the late Mr. A. T. Morrison as Chairman of that Council.

While the use of electricity for lighting had developed, gas still played its part in the domestic life of the country and was still preferred by many for cooking and for space and water heating. Two-thirds of all gas sold was used in the home. In industry it had an important and increasing part to play. The sale of gas for industrial purposes in Scotland had risen from 17½% of all sales in 1950-51 to 20% in 1953-54. In the Dumbarton and Helensburgh areas the supplies sold to industrial concerns had been trebled since vesting day, and one firm in the area was making alterations to plant as a result of which its demand for gas would rise from 100,000 cu.ft. to 1,125,000 cu.ft. daily.

Sir Frederick West speaks after lunch. Also in the picture are Sir Andrew Clow, Mr. James Stuart, Mr. D. D. Burns, O.B.E., and Mr. D. D. Melvin of the Scottish Gas Board.

SIR ANDREW CLOW, acknowledging the toast, said they were trying to meet the needs of both home and factory. He knew from his own home how greatly gas could add to one's comfort and he was glad to think that every day they were doing something for the happiness of the majority of people in Scotland. Some industrialists — and some housewives—were still ignorant of what gas could do, but Dumbarton was a centre where industry was alive to the possibilities and the new works would help industry there to advance.

He had listened to arguments on nationalisation by its exponents and its opponents and was often tempted to think he could provide better arguments for both sides. But it was not a question which really concerned the industry much in Scotland where about six-sevenths of the production had for long been under local authorities. Nationalisation merely altered the form of popular control, transferring direct responsibility from the Town Council in most places to Government and the Board, the latter benefiting from the foundations already laid and the traditions established. Dumbarton was one of the royal boroughs where the Board had benefited particularly and one of its best gifts was the Manager, Mr. McFadyen. The Board also greatly valued the co-operation of Town Councils like those of Dumbarton and Helensburgh.

The Dumbarton project was the largest the Board had yet added to the gas industry in Scotland, but it was originally initiated by Dumbarton Town Council, which also contemplated providing a supply for Helensburgh. These two boroughs were thus showing the way for a link up, a practice now being followed elsewhere throughout Scotland. They had expanded the idea and had in view a linking up with Glasgow. They had completed a pipe between Glasgow and Dumbarton and the new works would now supply gas to Glasgow while, if necessary, gas could be sent the other way.

Inside the works are Mr. Tom Steele, M.P., Sir Frederick West, Mr. James Stuart, and Mr. A. McFadyen, Manager.

On Government guidance Sir Andrew said he read much in the Press, no matter what party was in power, of the wrong things the Government had done or were doing. Less was heard of the good they did. He had considerable experience of the help a Government could give and was convinced that the future of the gas industry depended largely on guidance from Government and Parliament. The Board could not direct general policy and was bound to have a limited outlook. They were tempted to think that the prosperity of the gas industry was all that mattered and that the state of other fuel industries was not important. But what really mattered was the welfare of the public. That called for co-operation and he acknowledged the benefit of contact and understanding with other industries, including electricity and coal. They depended especially on the latter. But for a complete co-operative policy they were dependent on the Government.

Sir Andrew concluded by presenting Mr. Stuart with a silver casket as a memento of the occasion.

MR. D. D. BURNS, Deputy Chairman of the Scottish Gas Board, proposing 'The Guests,' welcomed representatives from the Government, the Town Councils of Dumbarton and Helensburgh, Dumbarton County Council, local industrialists, the civil service, the electricity industry, the Gas Consultative Council, the Gas Council, the Scottish Gas Managers Association, the staff and workmen of Dumbarton gasworks, the contractors and the Press. The Secretary of State was accompanied by Sir Charles Cunningham, Secretary to the Scottish Home Department and they had with them Major-General Telfer Smollett, Lord Lieutenant of Dumbartonshire, Mr. T. Steele, M.P. for Dumbarton West, Provost McLeod of Dumbarton and Provost Gordon of Helensburgh. Also present were Mr. J. S. Smith, Assistant Secretary of the Ministry of Fuel and Power, Gas Division, and Mr. James Campbell, formerly Regional Gas Officer for Scotland. The latter's knowledge of close on 200 gasworks had been invaluable in the early days of nationalisation. He welcomed Mr. J. S. Pickles, Chairman of the South Western Electricity Board, and Mr. E. Crowther, Chairman of the

(*Concluded on p. 780*)

CROSSING THE RIVER SEVERN with A GAS MAIN

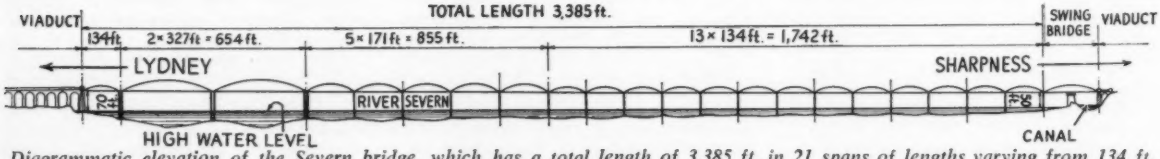
Some of the most complicated problems involved in the South Western Gas Board's integration scheme have been overcome by the Board's distribution department. These concerned the provision of a gas main from one side of the River Severn to the other and included submerging the main beneath the Gloucester-Berkeley canal in addition to overcoming the obstacle of a swing bridge.

The whole of the work was undertaken by contractors under the supervision of the area and Cheltenham Divisional distribution departments. Its progress was watched with interest by Mr. C. H. Chester, Chairman, the Chief Engineer, and other officials of the Board.

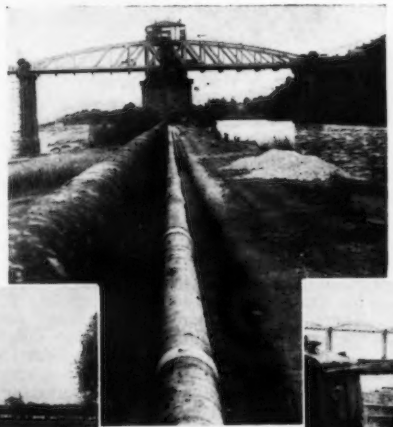
A diagrammatic elevation shows that the Severn bridge has a total length of 3,385 ft., made up of 13 spans of 134 ft. each, five spans of 171 ft. each, two spans of 327 ft., and a single span of 134 ft. The ends of the bridge spans at the piers are alternately fixed and free, so that expansion of the bridge can take place at every pair of spans. Provision had to be made in the pipeline not only for this expansion but also for any difference there might be between the pipe and the bridge.

It was necessary to lay the main along the river bed to the first pier to clear the moving span of the swing bridge. The top left photograph taken at low tide shows the pile driving rig, the tops of some driven piles and another on the platform ready. Two pipes will be laid along this under-water section.

The welded joints throughout were tested by gamma ray photographs, and the centre photograph above shows an exposure in progress. Our top right photograph shows the pipe being laid along the bridge deck.



Diagrammatic elevation of the Severn bridge, which has a total length of 3,385 ft. in 21 spans of lengths varying from 134 ft. to 327 ft.



Sharpness holder station and the 100 ft. wide canal, with welding in progress on the west towpath.

The wall and canal bank is of masonry and very little loose soil is available on top. The pipe was, therefore, laid in a shallow trench, a concrete dwarf wall being cast alongside. This was then back-filled with gravel and finished on top with cement. The centre picture below shows this work in progress and in the background can be seen the swing

Tubes being welded on the canal bank ready for the two crossings.

Above: On the canal bank.

bridge over the canal; also visible is the scaffolding up the first pier of the bridge proper and ready for the erection of the pipe to rise from the river bed.

The bottom left picture (p. 779) shows the holder station at Sharpness, and the canal, which is 100 ft. wide at this point. Also shown is the main being welded along the west towpath and the dredger which was used to make the preliminary trench across the canal. The trench was later completed by a diver. To meet the requirements of the Docks and Inland Waterways authorities, a depth in the centre of 20 ft. was provided, including 2 ft. of cover in the bed.

The bottom right hand picture on p. 779 shows the tubes, $\frac{3}{8}$ in. thick and 12 in. in diameter, being finally welded on the canal bank ready for the two crossings. The 'D' shape was obtained by bending at the contractors' works.

In the picture on the left are seen Mr. C. H. Chester, Chairman of the Board, with Mr. L. P. Ingram, Area Chief Engineer, and Mr. G. F. Oliver, Deputy Chief Engineer, being rowed over the site. On the far bank can be seen the gas main where it emerges from the canal crossing. The photograph on the right shows Mr. Chester inspecting the main on the Severn bridge. On his far right is Mr. Oliver, and between the rail way lines Mr. T. W. Clapham, Area Production Engineer. At the rear is Mr. T. L. Tallentire, Divisional Engineer and Manager, Cheltenham Division.

DUMBARTON GASWORKS—(*continued from p. 778*)

Northern Gas Board, with Mr. Brewer, Secretary of the Gas Council, and Sir Frederick West, whose Company was responsible for the gas-making plant. Sir Frederick had been Lord Mayor of Manchester and had filled numerous offices in connection with public and industrial affairs in and around Merseyside.

Mr. Burns concluded with an expression of thanks to the contractors. Their difficulties had been many.

PROVOST ALLAN MCLEOD (Dumbarton), responding to the toast, said that some critics of nationalisation argued that State control produced a sort of paralysis of individual initiative, but he thought the Board had shown remarkable courage. Under different circumstances he might have been in the chair that day! Unlike his predecessors in the civic chair, he never had the opportunity of presiding over a gas committee in their royal borough. He had come in at the burial stage and was most disappointed with the subsequent arrangements. The compensation paid to them on nationalisation was totally inadequate and they were not even allowed to invest the money in the common good. The Secretary of State insisted on it being credited immediately to rating. Nevertheless, in Dumbarton they would still continue to take a lively interest in the undertaking.

The creation of a public monopoly like gas raised the problem of safeguarding the interests of the consumer. They could discard the assumption that public ownership meant public service immediately and at all points. No policy could do more than strike a balance between conflicting considerations. It was true that the various Acts sought to meet the consumer's point of view, but the bodies set up for that purpose had been either amateur bodies uncertain of their standing or mere appendages, pliable in the hands of authority. At least one Consumers' Council had openly fallen into the habit of speaking of 'the consumers' best interests,' which meant not what the consumer wanted but what was thought by his betters to be good for him! If consumer representation meant anything it meant the ability to voice points of view effectively. It implied that the Consumers' Councils and similar bodies were the consumers' watch dog. What had happened was entirely different, whether from weakness or vagueness in the Acts or from the nature of the administrative steps taken to implement them. Consumer representation without teeth had yet to show how it could be effective. It was a problem to be solved if the consumer's point of view was to be adequately represented.

A Water Problem

Provost McLeod said that Dumbarton had a water problem and he suggested that a Government grant should be available to pay for a scheme necessary to provide water to local establishments, including the gasworks.

SIR FREDERICK WEST, who also replied to the toast, said he had attended a similar function in Dumbarton in 1921 when the first installation was opened, his firm being privileged to complete it. There was a lamentable ignorance on the part of the public regarding what gas could do in the home and he recalled a certain bank being worried about an overdraft incurred by a gas undertaking because it was uncertain of the future of the industry! In Tokio he had found in 1930 that as much gas was made there as in Glasgow or Birmingham and output there had doubled in the last 16 years. The same story applied to many other places. He expressed his thanks on behalf of the contractors to Mr. McFadyen and the local officials for their co-operation.

Sydney Gasholder

The North Shore Gas Company, North Sydney, Australia, has entrusted the Power-Gas Corporation (Australasia) Pty., Ltd., with an order for the supply, delivery, and erection at Willoughby of a 1 mill. cu.ft. capacity three lift spiral guided gasholder complete with steel tank.

The tank and all lifts will be of welded construction and radiographic inspection will be carried out on the welded seams of the tank sides. All materials will be of Australian manufacture and the lift sheeting will have a minimum thickness of $\frac{7}{16}$ in., which is normal practice in Australia at the present time. The Power-Gas Corporation (Australasia) Pty., Ltd., is a subsidiary of the Power-Gas Corporation, Ltd., Stockton-on-Tees.

Pupil Engineers

A new development of the North Western Gas Board's plans for training future gas engineers began on September 27, when 38 pupil engineers from the Board's area, together with three from the Wales Gas Board, started work at the Royal Technical College, Salford, on a three-year 'sandwich' course on gas production and distribution.

The course, which has been organised by the Board's Training and Education Section with the co-operation of the college, provides for periods of six months in college alternating with six months' industrial experience.

The course, full details of which were revealed by the Board last July, embraces several non-technical studies. These include social and general subjects in the first year's curriculum, and administration of the gas industry in the final year. The course has been planned to provide future gas engineers with a liberal technical education.

Gas Industry in Northern Ireland

PRESIDENTIAL ADDRESS TO THE IRISH GAS ASSOCIATION, ON SEPTEMBER 22, 1954, BY

R. F. POLLOCK,

Managing Director, Enniskillen Gas Company.

In presenting my Address I do so conscious of my own shortcomings in technical knowledge and 'know-how' on the one hand, and on the other, the outstanding experience and attributes which distinguish many of our own members and the prominent men of the gas industry abroad who have come to this meeting. It is my special pleasure to welcome them here and I hope when our problems have been stated they will be able to offer us good advice. As President of the Irish Gas Association I also hasten to express the sense of honour and privilege I feel in occupying this position today, and to assure you that whatever other qualities I may lack my enthusiasm and desire for the progressive betterment of the gas industry is deep-rooted and, at least on this matter, I consider myself second to none.

Much of what I will say may be controversial and not entirely to the liking of some here, but I am sincere in my beliefs and, moreover, fortified by the knowledge that in the presentation of the Presidential Paper it is accepted that the occupant of the Chair expresses his opinions as he sees the situation without challenge.

I would like to make it clear that my paper is concerned primarily with the Northern Ireland section of the gas industry, and is written from my point of view as Managing Director of one of the smaller works. My special desire is to enlist the sympathy, support, thought and undoubted ability of the gas industry itself towards the development of gas throughout Ireland by every possible means.

No Complaint

I would like to report that from my knowledge and the information reaching me, the gas industry in Northern Ireland has little, if any, complaint as related to the demand for gas. There has been a notable increase in the sales of all types of apparatus, especially cookers, gas wash boilers and hot water appliances, and, among those undertakings who can finance hire purchase schemes, full advantage is being taken of this ready market. Unfortunately, however, many of the small undertakings due to lack of capital have to restrict development and have not been able to meet the demand for apparatus. The fact that any community is restricted or deprived of our services on such grounds is deplorable and steps should and must be taken to make available the necessary capital on reasonable terms to enable every undertaking, however small, to develop mains, install services and provide apparatus wherever the demand occurs.

In considering the remedy for this state of affairs it has not escaped me that a ready-made solution might be suggested by pointing across the Irish Sea to the nationalised industry in Great Britain. Politically opposed as I am to State control of industry, I nevertheless must agree that the situation of small works must have greatly benefited by linking of their control with the larger undertakings, and that not only has the problem of capital finance been solved, but the technical services of experts have become available; the greater bargaining power of bulk buying is shared and manufacture and distribution is planned on a regional basis. At this stage the question might well be asked, 'If nationalisation has such self-evident advantages from the small works point of view, why look further for a solution to our difficulties?' My answer is that apart from inevitable defects which it is not my function to suggest or endeavour to define, I believe for us there is a better solution than that of nationalisation. I believe that, if achieved, a situation where integration and close working is secured throughout the whole industry and effectively underwritten by the Government, all the benefits of nationalisation will be obtained without any loss of local interest, or incentive to our best efforts. I must at once admit that without Government assistance I do not visualise that voluntary co-operation would develop with sufficient speed or effectiveness to meet our needs, such is in general the resolute independence of our northern spirit.

The Government have—by means of loans and subsidies reasonably safeguarded by prior investigation and subsequent control of one sort or another—stimulated agriculture, linen, fisheries, transport, industrial coal, electricity and numbers of other industries but, so far, not gas. I believe our Government in Northern Ireland is sound and progressive in industrial matters and that a combined approach to it by our industry with constructive proposals will secure its co-operation.

What exact form these proposals should take is the concern of the industry as a whole and must be weighed by the views of the large as well as the small undertakings; neither must the special position of local authority controlled undertakings be overlooked. With some temerity and being conscious of my own deficiencies, I would suggest there should be set up by the Government a consultative body armed with enabling powers to secure the maximum economic development of the industry. The details of the composition of this body and how it should operate should, as I have indicated, be the subject of consideration and representation by the industry as a whole. In the forefront of our proposals, however, should be the provision of development monies which would take into account not only the immediate re-equipment of the industry, but their effect on the unemployment problem, the fostering of local industries and their influence in retarding the drift of population to the larger urban areas.

I would also like to draw the attention of the Government to the very obvious advantages which would accrue to the country by giving our industry financial support to modernise manufacture operations. With the immediate increase in efficiency of plant, there would be material reduction in coal carbonised and reductions in cost of supply would result in savings of domestic coal by greater consumer utilisation.

Urgent National Importance

The demand for coal in England and indeed the world, is increasing annually, whereas the supply tends to decrease and it must follow that the best possible use of coal resources should be made. Proper carbonisation of coal in modern gasworks is recognised as enabling one of the highest efficiencies of utilisation, and even on local grounds if, as we are informed, decreased supply to Northern Ireland in the future is a possibility then the replacement of coal burned through domestic grates by our more thermally efficient products is a matter of urgent national importance.

On the question of employment, very important to the Government and the country, a re-vitalised gas industry would ensure a benefit for many years to come covering plant construction work, main laying through the province, manufacture of meters and appliances and the utilisation both direct and by associated employment of technicians and general personnel. It is difficult to enumerate the large number of firms which would benefit in Northern Ireland from such a development.

In the Technical Press it has been stated that, with the coming of the atomic age, the general tendency will be towards small towns and village life, and it is significant that the desirability is advocated by our northern Government in the encouragement of new industry. In Northern Ireland there are many towns and villages which are at present without a gas supply, and under the scheme I advocate they offer a ready field for development of gas amenities and employment of labour.

Two years ago, at our annual meeting in Londonderry,

(*Concluded on p. 787*)

Gas Manufacture by

The Tully Complete Gasification Process

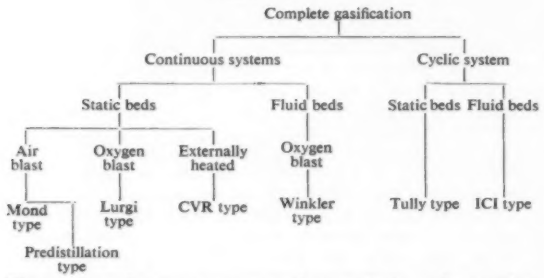
PAPER TO THE IRISH GAS ASSOCIATION, SEPTEMBER 22, 1954, BY

J. E. TULLY, B.Sc. A.R.I.C.

The term 'complete gasification' is used to describe plants that convert coals direct to gas in one process. It is sometimes erroneously used to represent one particular process and thus a certain amount of confusion arises. The Tully complete gasification process is a cyclic, static bed type; and although it is not possible to discuss other types within the scope of this paper, it is, nevertheless, necessary to consider this system of complete gasification in relation to other types.

The various systems of complete gasification can be conveniently classified according to the diagram in Table 1.

TABLE 1.



There are, of course, many other varieties of complete gasification plant, but the majority can be classified under the same headings as typified. Each type of plant has been developed to meet a particular set of conditions, and it is not feasible to apply any system of complete gasification for the manufacture of any one particular gas. The major factors to be considered are:—

Available fuel
Utilisation of the resultant gas
Capital cost of the installation.

Briefly the above types can be employed economically under the conditions shown in Table 2.

The Tully system of complete gasification is a process that has been developed over the past 50 years. In 1898,

TABLE 2.

Plant type	Fuel range	Gas utilisation	Capital cost limitations
Mond producers	Low volatile graded coals or coke.	Direct firing industrial heating. Town gas dilution.	Plant can be constructed over a wide output range.
Predistillation producers.	High volatile graded coals, weakly or non-caking.	Industrial firing.	Plants can be constructed over a wide output range.
Lurgi	A wide range of fuel.	Synthesis gas. Town gas.	The capital cost imposes a limit on the minimum size of plant; at present this is in the region of 15 mill. cu. ft. per day.
CVR	Graded carbonising coals.	—	In general this type of plant is uneconomic.
Winkler	A wide range of small grade fuels.	Synthesis gas. Town gas.	The capital cost imposes a limit on the minimum size of plant.
Tully type ..	Graded coals, weakly or non-caking.	Industrial firing. Town gas dilution. Town gas (carburetted).	Plant can be constructed over a wide output range.
ICI	A wide range of small grade fuels.	Synthesis gas. Town gas.	Uneconomic for small plants.

C. B. Tully, in conjunction with V. B. Lewis, developed a plant for the enrichment of water gas with methane derived from the cracking of fuel oil on the incandescent fuel bed of a water gas generator. This plant was known as the methane-hydrogen plant. While it was found possible to manufacture a satisfactory gas, the cost of the oil made the system uneconomic. Consequently the fuel oil was replaced by tar, which, at that time, was a waste product. This process was patented in 1901 to Specification 26461. When using 3 gal. of tar per 1,000 cu.ft. of water gas, gas of approximately 435 B.Th.U. was obtained having the following percentage composition:—

CO_2	O_2	C_nH_m	CO	CH_4	H_2	N_2
4.0	0.0	3.5	30.0	8.0	50.0	4.5

Subsequently the plant was modified so that the waste

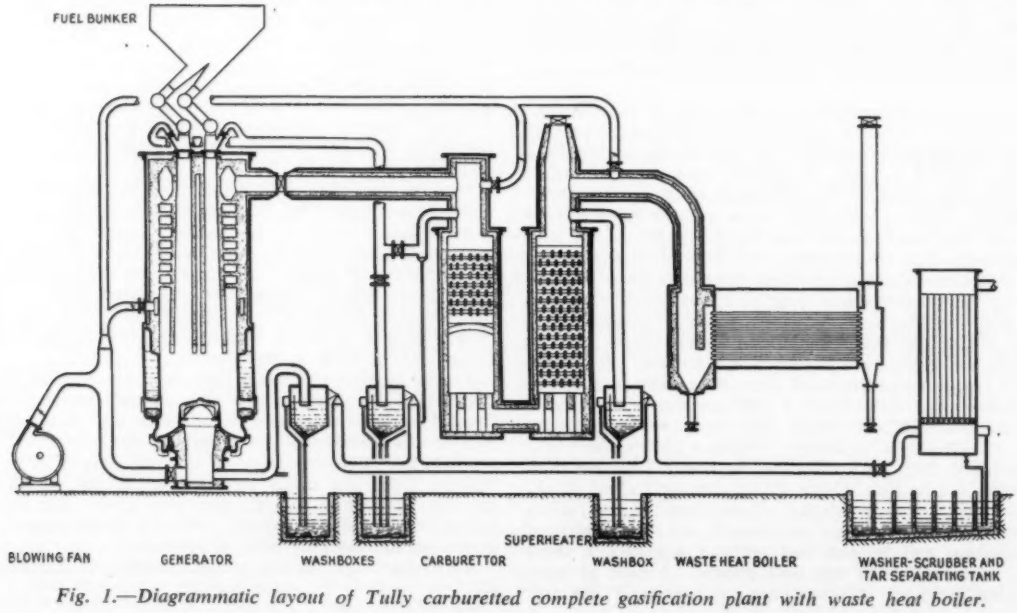


Fig. 1.—Diagrammatic layout of Tully carburetted complete gasification plant with waste heat boiler.

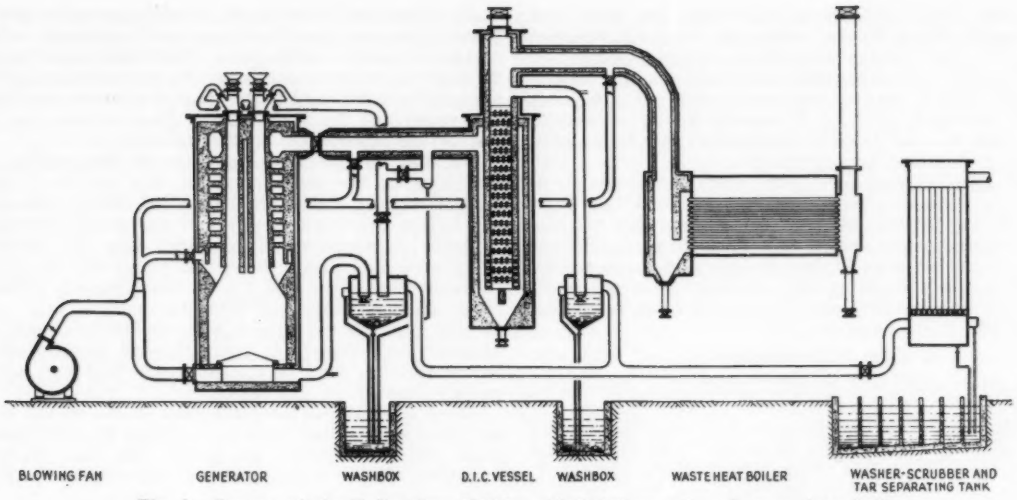


Fig. 2.—Layout of the Tully plant C.C.G. with D.I.C. vessel and waste heat boiler.

blow gas passed up through the flues surrounding the upper part of the fuel bed, thereby heating what was, in effect, a superimposed retort. Developments in the use of tar, particularly for road making purposes, raised the price to an extent where this system was no longer economic and consequently the plant was further modified to use coal instead of coke. Other modifications were carried out to crack the nascent tar vapours. This process was patented in 1907 to Specification 3689. During the same year other patents were taken up for various components of the plant, including one for a manually operated cycle controller.

Various units were installed as diluent plant instead of water gas plant, and the system had obvious advantages to overcome the conditions arising out of the shortages brought about by the 1914-18 war. Between 1918 and 1921 some 150 Tully complete gasification plants were erected in the British Isles, and since the introduction of the process plants to the extent of 400 mill. cu.ft. per day have been constructed, of which 20 mill. cu.ft. per day are of recent manufacture. At the present time plant totalling approximately 80 mill. cu.ft. per day is known to be in operation both in this country and on the Continent.

The vogue for complete gasification that existed after the 1914-18 war was short-lived. The carbonising plant of the industry that required renewal was replaced by new systems of carbonisation, particularly the continuous and intermittent vertical retort systems. However, in certain areas, particularly the Fife area in Scotland, coal was available at an economical price with properties particularly suited to complete gasification, and consequently this system of complete gasification was retained.

By 1923 the system had been modified to incorporate oil carburetting facilities and waste heat recovery, similar to that for the carburetted water gas process, and in 1926 a system of positive acting mechanical operation had been designed and put into use. The resultant labour saving of automatic operation was recognised by certain undertakings and some works were converted to manufacture all-Tully complete gasification gas, which was distributed at a calorific value of 340 B.Th.U. per cu.ft.

In general the application of complete gasification plants before 1945 was restricted to those undertakings that had already proved its feasibility, and the last war gave little scope for further development although the field of application was widened to a limited extent. The develop-

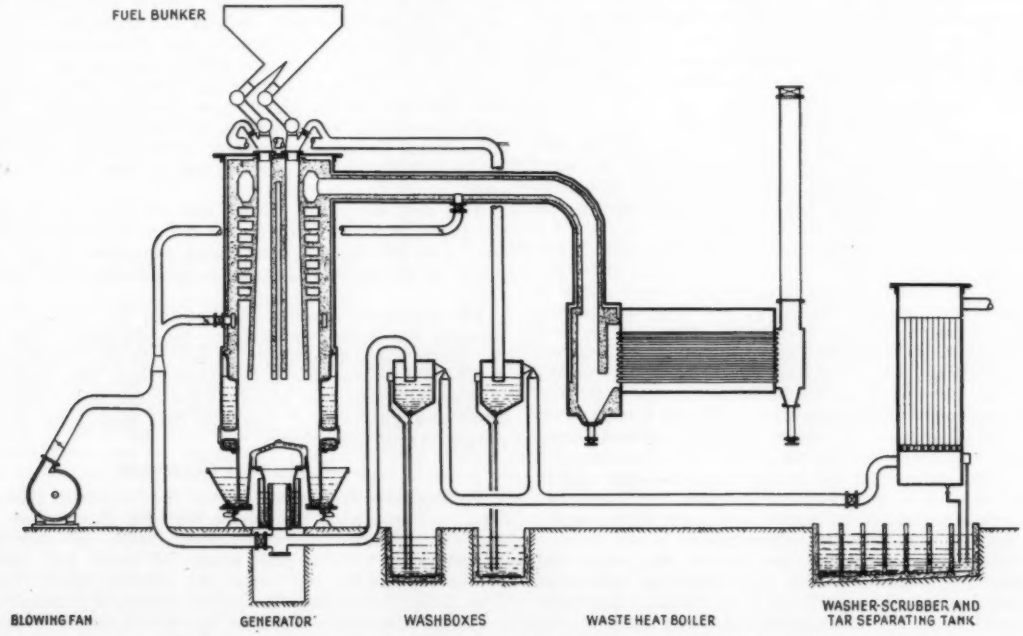


Fig. 3.—Diagrammatic layout of Tully complete gasification plant with waste heat boiler.

ments that have been carried out since the war have been brought about by the realisation of the economies effected by employing carburetted complete gasification plants in place of carburetted water gas plants. Moreover, the price of gas oil relative to the price of coal and coke has been sufficient to make a marked difference between the cost of C.W.G. production and carburetted complete gasification gas production.

Recent developments have been made in the design of the Tully complete gasification generator and the Tully system of carburetted complete gasification gas production, to enable a wider variety of coals to be used. Hitherto the process has been limited to coals which are strictly non-coking and non-caking—*i.e.*, to Class 300 type coals. These new developments permit coals of Class types 700, 800 and 900 to be employed.

The Tully System

The Tully system of complete gasification consists of distilling coal in a vertical retort over a water gas generator and converting the resulting coke to water gas by the usual method of blowing and steaming. The coal charge is heated partially by the chequer-work about the retort, which in turn is heated by the blow gas, and partially by the sensible heat of the water gas which passes up through the retort during the up-run phase of the cycle. The system is similar in operation to the water gas system of gas manufacture; the cycle of operation being identical: Blow, purge, up run, down run, and purge up run.

Blow Phase.—Air is admitted under the grate and burns with carbon in the reaction zone. Waste blow gas passes from the reaction zone through the nostril ports to the chequer-work around the retort and then out of the generator. Secondary air is admitted just above the nostril ports, and this burns the carbon monoxide in the blow gas in the chequer-work.

Purge.—Steam is admitted under the grate, and passes into the reaction zone. The water gas produced then passes through the nostril ports up through the chequer-work and out of the generator, thus clearing the generator of blow gas.

Up Run.—Steam is admitted under the grate and reacts with the carbon in the reaction zone to form water gas. The water gas then passes up through the retort and thence to the washbox, together with the distillation gas.

Down Run.—Steam is admitted to the top of the chequer-work around the retort, and passes down the chequer-work, and through the nostril ports into the reaction zone. The resulting water gas passes out under the grate to the washbox.

Purge Up Run.—This is the same as the main up run and is used to clear the space under the grate of water gas prior to the blow and thus prevent an explosive mixture forming at the beginning of the blow.

Carburettor and Superheater

When gas is required up to a calorific value of 500 B.Th.U. or over, a carburettor and superheater are used as for a carburetted water gas plant. The cycle of operation is as follows: Blow, purge, up run with oil, up run without oil, down run, and up run purge.

Blow Run.—Air is admitted under the grate and burns with carbon in the reaction zone. The waste blow gas passes from the reaction zone through the nostril ports to the chequer-work around the retort and then out of the generator to the top of the carburettor. They then pass down through the carburettor and up through the superheater. Secondary air is admitted just above the nostril ports in the generator, and tertiary air is admitted into the generator-carburettor connection. These auxiliary air supplies are adjusted by means of butterfly valves to burn the carbon monoxide in the waste gas and maintain the designed temperatures in the retort chequer-work and in the carburettor and superheater. During the blow run the distillation gas from the retort passes out to the washbox via a controlled by-pass connection.

Purge Run.—Steam is admitted under the grate and passes into the reaction zone. The water gas produced then passes through the nostril ports up through the retort chequer-work into the carburettor and out through the superheater.

Up Run with Oil.—Steam is admitted under the grate, passes into the reaction zone, and combines with the carbon to form water gas. The water gas passes up through the retort and thence into the carburettor. Oil is sprayed into the carburettor and is cracked and fixed in this vessel and the superheater. The resulting gas passes out of the superheater to the washbox.

Up Run without Oil.—This phase of the cycle is exactly the same as the previous phase, but no oil is injected. This is to ensure that all the oil injected is converted to gas before the plant is put into the down run phase.

Down Run.—Steam is admitted into the top of the superheater and passes down this vessel into the carburettor and thence into the top of the generator, down the retort chequer-work, and into the reaction zone. While passing through the superheater, carburettor, and retort-chequer work, the steam is superheated, thereby returning to the reaction zone of the generator heat that had been carried forward by the blow gas.

Purge Up Run.—This is the same as the up run without oil phase and is used prior to the blow to clear water gas from the space under the grate, and thus prevent an explosive mixture forming at the beginning of the blow.

Dust Intercepting Carburetting Vessel

When only a moderate degree of oil carburetting is required a dust-intercepting carburetting vessel can be used instead of the usual carburettor and superheater. This vessel is capable of raising the calorific value of the gas made by 150 B.Th.U. per cu.ft. and has the added advantage that it forms an excellent dust interceptor. The cycle of operation is the same as for plant with carburettor and superheater, and the various phases act in the same manner.

The blow gas, after leaving the generator, is made to travel around the outside of a column of chequer-work and then up through this chequer-work. The spiral motion imparted to the gas flow ejects the dust and grit at the bottom of the vessel, as in a cyclone separator. The design is so arranged that the main gas flow does not come in contact with the settled dust, so there is little danger of its being picked up again during the up or down run phases. This type of equipment is particularly useful where low grade dusty fuels are used.

Waste Heat Boiler

With a Tully complete gasification plant, it is usual to install a waste heat boiler, as this forms the most efficient method of recovering the low temperature waste heat from the blow gas. The waste heat boilers are usually of the horizontal fire-tube type, as this facilitates tube cleaning. The boilers can be designed to raise all the steam required for both the plant process and for driving all the plant machinery. A waste heat boiler can be used in conjunction with any of the plant types described above, and the installation can be designed to be independent of any other plant or power generator apart from a small boiler or electrically driven blowing set to start the plant from cold.

The cost of steam raising and the cost of power for the machinery is usually in the region of 10%-15% of the final cost of the gas made, and therefore a waste heat boiler is an essential feature from an economic point of view.

The plants are designed so that only the blow gas passes through the waste heat boiler. No alteration is made to the phase sequence of the cycle. On the larger units a small amount of steam is injected into the smoke box during the down run phase to clear the boiler tubes and admission chamber of any gas that may have collected during the up run phases.

Mechanical Operation

Tully mechanical operators are the 'common camshaft' type, with mechanical linkages between the various cams and the operated valves. This system of mechanical operation was developed some 30 years ago and the present machines are based on these original designs. This design of automatic control makes it impossible for a dangerous valve sequence to be obtained. All the valves, the stack valve, are locked in the closed position

with a toggle action so that it will remain closed in the event of a linkage failure. The mechanical linkage between each cam and the various valves includes a spring compression mechanism designed to remove any backlash in the system and provide a closing load for the valves.

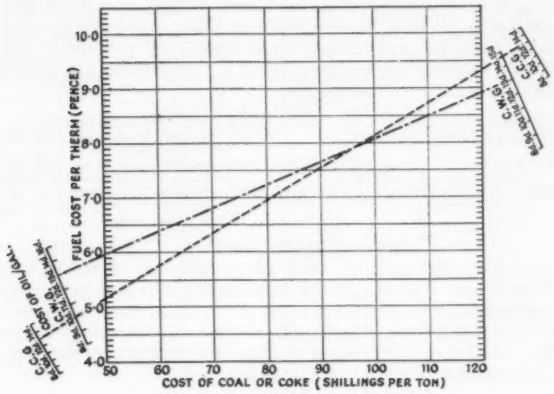


Fig. 4. Fuel cost at 400 B.Th.U.

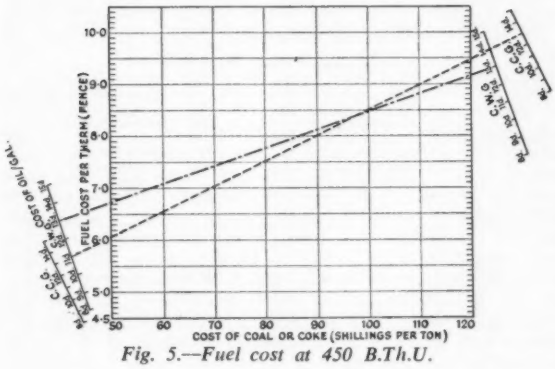


Fig. 5.—Fuel cost at 450 B.Th.U.

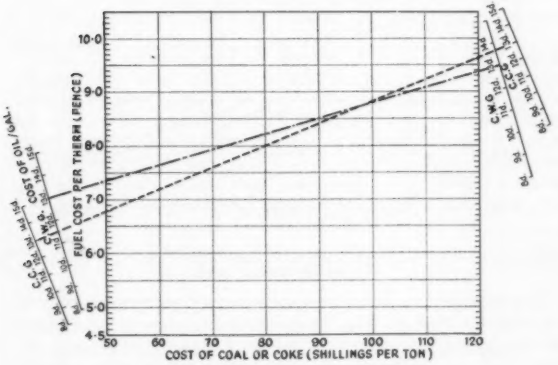


Fig. 6.—Fuel cost at 500 B.Th.U.

No. Ic Mechanical Operator.—This is a six-cam machine and is used on small plants up to 0.5 mill. cu.ft. per day capacity. The prime mover can be either an electric motor or a steam engine and the design allows both to be used. Provision is made to operate the camshaft manually. The timing mechanism can be designed for a total cycle time from 300 to 400 sec. and the cycle is divided into 40 equal parts, so that the various valve changes can be adjusted in intervals of 2.5% of the total cycle time.

Should the blast valves be opened when the blast pressure is less than the pressure in the plant, obviously gas will pass back through the blast valves into the air main and ignite, sometimes explosively. In order to avoid this dangerous condition a safety device is incorporated in the mechanical operator. This consists of a diaphragm operated by the blast pressure which in turn controls the timing mechanism. If the blast pressure falls below 4 in. W.G during the gas-making part of the cycle, then the operator is automatically stopped in the up run purge position, so that the plant cannot proceed to the blow run.

This safety device affords a convenient means of stopping the operator temporarily for charging, etc., without stopping the prime mover. A three-way valve is arranged so that the control diaphragm can be vented to atmosphere during the blow phase, and then the operator will automatically stop in the purge position. When the plant steam is shut-off manually the plant is in a temporary shutdown condition and charging, etc., can be carried out.

Provision is made so that the timing mechanism can be advanced or retarded manually so as to reduce or increase any part of the cycle as desired.

No. IIIa Mechanical Operator.—This is a seven-cam machine and is used on plants up to 2 mill. cu.ft. per day capacity. The prime mover is an electric motor and provision is made so that a stand-by steam engine can be readily used, or the machine can be operated manually.

The timing mechanism is extremely flexible and allows for the total cycle time to be varied from 150 sec. to 480 sec. in steps of 5 sec. The main feature is that any phase of the cycle can be adjusted without interfering with the duration of any other phase. The machine incorporates a similar safety device controlled by the blast pressure as for the No. Ic machine.

No. IIIb Mechanical Operator.—This is a six-cam machine and is indentical with the No. Ia type. It is used on plants up to 1 mill. cu.ft. per day capacity.

No. IVa Electro-hydraulic Controller.—The Tully electro-hydraulic controller operates the various valves by means of hydraulic slave cylinders controlled and interlocked electrically. Briefly, the system consists of a hydraulic ring main system, complete with accumulator, feeding the various slave cylinders. Electrically operated four-way valves control the flow of hydraulic fluid to and from the slave cylinders and each control valve is selected from a master drum-controller. The master drum-controller is electrically driven and controlled by an electronic timing bank, which consists of an individual variable timer for each phase of the cycle. The drum-controller incorporated safety interlocks for air blower pressure, steam pressure, gas outlet pressure, waste heat boiler inlet temperature, inspection door locks, and other safety devices according to the design of the plant. Moreover, the drum-controller initiates proportional creeper control for the auxiliary air supplies and steam supply.

All the electrically operated slave cylinder control valves are spring loaded to safety. In the event of failure of the electricity supply, all the control valves are automatically returned to a position such that the slave cylinder places its valve into the 'safety' position—*i.e.*, with all plant valves shut except the stack valve.

This type of automatic controller is particularly designed for use on large gas-making units intended for base load working. It ensures that the maximum efficiency of the plant is maintained under all conditions of operation, and allows the cycle time and valve operation sequence to be adjusted with greater accuracy than with the mechanical operators.

Economic Aspects

As stated earlier in the paper the major factors to be considered when choosing a complete gasification plant are the available fuel, the utilisation of the resultant gas, and the capital cost of the installation.

Fuel.—The Tully process is designed to use the coal that has weak caking properties and with a swelling index not greater than 3-3½. The coal, preferably graded, should be within the size range of ¼ in.-3 in. In general the grading should not contain more than 10%-15% of fines less than ¼ in. Coal types 300, 700, 800, and 900 can be readily gasified to give a gaseous yield of 180 therms per ton, and, broadly speaking, these coals, containing approximately 10% of inerts, yield 150-165 therms per ton as fed. It will be seen that suitable coals for the Tully process are available throughout the British Isles.

Gas Utilisation.—By employing the various systems of

oil carburetting as detailed in the foregoing section, a gas of any desired calorific value from 340 to 500 B.Th.U. can be readily manufactured. The plant can be designed for base load working either as a straight complete gasification plant for dilution purposes or as a carburetted complete gasification plant for town gas manufacture. The plants can be constructed for outputs as small as 2,000 cu.ft. per hour, on one hand, and up to 5 mill. cu.ft. per day on the other. Consequently, it is necessary to take consideration of all the local conditions of labour, fuel, gas demand, and similar items before the type of plant can be decided. Moreover, the refinements giving small increases in efficiency are of considerable importance in the large scale plants whereas they are relatively unimportant in the smaller units. One important factor which applies to the whole range is the fact that all units can be operated mechanically and thus reduce the labour per therm required for gas-making. It is considered in some quarters that mechanically operated plants cannot be employed in the smaller gasworks, but practical experience over a long period of years has proved the contrary in the case of Tully plants.

In general, one can assume that the degree of mechanisation and automatic control of a plant increases with the capacity. Thus, with plants up to 0.5 mill. cu.ft. per day, it is usual to employ hand clinkering, hand charging, and a minimum of automatic controls other than mechanical operation for the cyclic process.

With plants in the range of 0.5 mill. cu.ft. per day to 1 mill., it is usual to employ either hand clinkering or automatic clinkering depending on the nature of the fuel and either hand charging or automatic charging, depending on the purposes of gas manufacture. In this range of plants the degree of automatic control is increased above that for the smaller range although this again depends upon the extent to which the plant will be used.

Plants in the range from 1 mill. to 5 mill. are of necessity automatically clinkered and mechanically charged, and it is essential on the larger units to employ a considerable amount of automatic control, together with a precise form of automatic operation for the cyclic process to ensure that operation of the gasification system is maintained at a high level at all times. Thus, it will be seen that it is possible to construct a Tully complete gasification plant to meet most requirements of gas utilisation. Table 3 shows the recommended Tully systems for various gas utilisation requirements.

TABLE 3.

Industrial direct firing	Tully predistillation producer.
Town gas dilution (base load) ..	Tully complete gasification plant with waste heat boiler.
Town gas dilution with carburetting facilities to meet peak load.	Tully complete gasification plant with D.I.C. vessel and waste heat boiler.
Base load plant to manufacture gas up to 500-550 B.Th.U.	Tully complete gasification plant with carburettor, superheater, and waste heat boiler.

Capital Cost

The capital cost of any given size of plant depends largely on the degree of mechanisation and automatic control, and these factors are decided by cost and availability of labour, together with the requirements of the gas utilisation. Table 4 shows the recommended Tully systems for various plant ranges.

TABLE 4.

Plant Capacity	Base Load	Base and Peak Load	Peak Load Only
Up to 0.5 mill. ..	Hand clinkered. Hand charged from skip on a telpher. Auto-operated.	ditto	ditto
0.5 to 1 mill. ..	Mechanically clinkered. Auto-charged. Auto-operated. W.H. recovery.	ditto	Hand clinkered. Hand charged from skip on telpher. Auto-operated.
1 mill. upwards	Mechanically clinkered. Auto-charged. Auto-operated. W.H. recovery.	ditto	Mechanically clinkered. Auto-charged. Auto-operated. W.H. recovery.

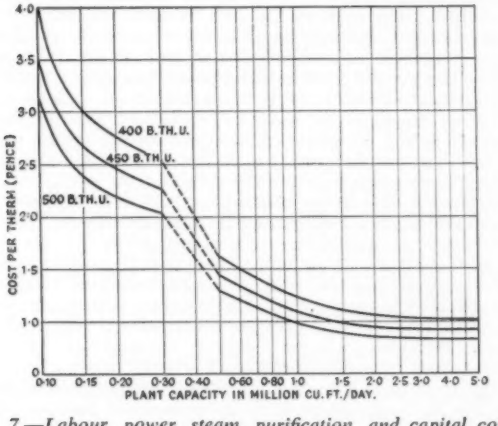


Fig. 7.—Labour, power, steam, purification, and capital costs, C.C.G. base load.

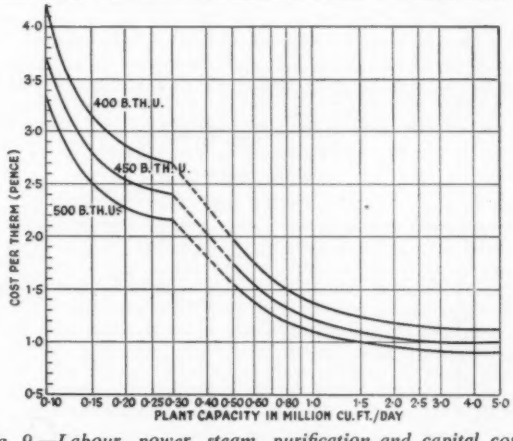


Fig. 9.—Labour, power, steam, purification and capital costs, C.C.G. peak load.

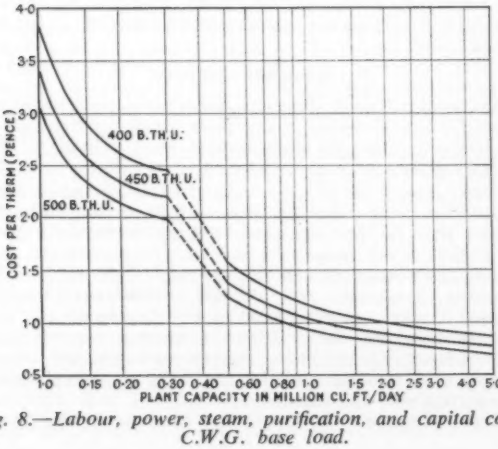


Fig. 8.—Labour, power, steam, purification, and capital costs, C.W.G. base load.

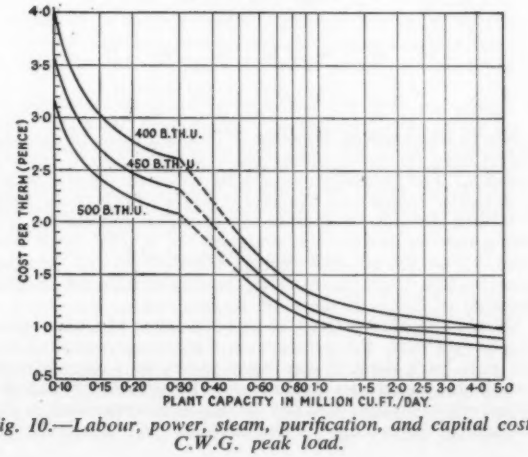


Fig. 10.—Labour, power, steam, purification, and capital costs, C.W.G. peak load.

All auto-charged plants are fed from an overhead bunker and skip hoist system.

The above arrangements require the minimum capital expenditure consistent with the anticipated method of plant operation. It is essential to consider the capital cost

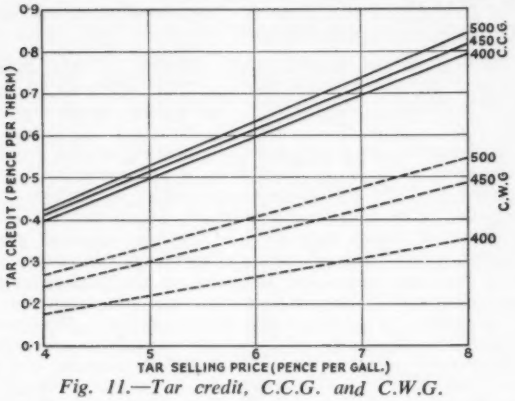


Fig. 11.—Tar credit, C.C.G. and C.W.G.

in relation to the labour costs, and at the present time the latter requires a high degree of mechanisation on plants producing 1 mill. cu.ft. per day or over, in order to maintain the cost of gas production at a minimum.

Cost of Gas Production

Since the cost of gas production depends on many variables, including the size of plant, cost of fuel, cost of labour, etc., it is difficult to present a true figure. To obtain an approximate cost of gas production, the graphs shown in Figs. 4-10 have been prepared. Figs. 4, 5, and 6 show the fuel cost for 400, 450, and 500 B.Th.U. gas respectively. These graphs show the cost of carburetted complete gasification gas in pence per therm for a varying cost in the price of coal or coke, in shillings per ton, and a varying cost of oil, in pence per gallon. For the purposes of illustration, lines have been drawn for an oil cost of 13.0d. per gal., which is an average present-day price. It is useful to compare the cost of carburetted complete gasification gas with the cost of carburetted water gas, and consequently the graphs shown in Figs. 4, 5, and 6 include the fuel cost in respect of carburetted water gas.

Figs. 7 and 8 show the cost of labour, power, steam, purification, and capital costs in pence per therm for various plant capacities. These costs are again shown for 400, 450, and 500 B.Th.U. gas. Fig. 7 shows these costs for carburetted complete gasification plant under base load conditions, and Fig. 8 shows carburetted water gas plant costs when used for base load. Fig. 9 shows the cost of carburetted complete gasification gas for various plant capacities when used for peak load, and Fig. 10 shows similar costs for carburetted water gas plant.

These graphs are based on the following data:—

	Carburetted Complete Gasification Gas	Carburetted Water Gas
Fuel consumption ..	47.6 lb. of coal per 1,000 cu. ft. at 340 B.Th.U.	36.1 lb. of coke per 1,000 cu. ft. at 290 B.Th.U.
Oil consumption ..	1.25 therms per gal. yielding 110 cu. ft. per gal.	1.25 therms per gal. yielding 110 cu. ft. per gal.
Tar yield	15 gal. per ton of coal gasified + 15% of oil used.	15% of oil used.
Steam	Steam costs taken at 3s. 4d. per 1,000 lb. for plants without W.H. boilers (*i.e.*, up to 0.3 mill. cu. ft. per day).	
Labour	Costs based on 28s. per manshift.	
Purification ..	Costs based on 0.5d. per 1,000 cu. ft. of gas made.	
Electric power ..	Costs based on 1.0 kWh per 1,000 cu. ft. up to and including 1.0 mill. cu. ft. per day, 1.2 kWh per 1,000 cu. ft. for plants above this size. Cost of 1 kWh taken at 1.0d.	

Example for 1 mill. cu.ft. per day plants with costs as follows:—

Coal	at 75s. per ton.
Coke	at 80s. per ton.
Oil	at 13d. per gal.
Tar selling price	8d. per gal.

Carburetted Complete Gasification

	Base Load			Peak Load		
	Plant			Plant		
Calorific value	400	450	500	400	450	500
Fuel and oil (Figs. 4, 5, 6) ..	6.65	7.34	7.78	6.65	7.34	7.78
Capital, labour, etc. (Figs. 7, 9) ..	1.22	1.08	0.97	1.36	1.21	1.09
	7.87	8.42	8.75	8.01	8.55	8.87
Tar credit (Fig. 11)	0.80	0.82	0.84	0.80	0.82	0.84
Net cost, pence per therm ..	7.07	7.60	7.91	7.21	7.73	7.93

Carburetted Water Gas

	Base Load			Peak Load		
	Plant			Plant		
Calorific value	400	450	500	400	450	500
Fuel and oil (Figs. 4, 5, 6) ..	7.20	7.77	8.20	7.20	7.77	8.20
Capital, labour, etc. (Figs. 8, 10)	1.15	1.02	0.92	1.29	1.14	1.03
	8.35	8.79	9.12	8.49	8.91	9.23
Tar credit (Fig. 11)	0.35	0.48	0.54	0.35	0.48	0.54
Net cost, pence per therm ..	8.00	8.31	8.58	8.14	8.43	8.69

TABLE 5.

Comparative Costs of C.W.G. and C.C.G. for various sizes of Plant.

	Base Load			Peak Load		
	Plant			Plant		
Calorific value	400	450	500	400	450	500
C.C.G. 0.5 mill. per day ..	7.47	7.96	8.23	7.83	8.28	8.49
C.W.G. 0.5 mill. per day ..	8.40	8.65	8.90	8.73	8.97	9.18
C.C.G. 1 mill. per day	7.07	7.60	7.91	7.21	7.73	7.93
C.W.G. 1 mill per day	8.00	8.31	8.58	8.14	8.43	8.69
C.C.G. 4 mill. per day	7.86	7.44	7.77	6.97	7.52	7.84
C.W.G. 4 mill. per day	7.55	8.07	8.54	7.65	8.18	8.67

MR. R. F. POLLOCK'S PRESIDENTIAL ADDRESS—Concluded from p. 781.

a very interesting paper was read on liquid gases, but, at that time, investigation disclosed that freight charges and the non-availability of proper shipping facilities made the project prohibitive. Recently, the suppliers of L.P. gases have introduced specially designed ships to bring supplies to Ireland for bulk storage and the disadvantage of containers being returned to the refineries has been eliminated and transport costs correspondingly reduced.

Most managers will agree with me that the prices being obtained for gasworks crude tar scarcely cover handling costs and the economics of tar disposal. I feel that we should, as an industry, investigate the possibilities of centralised distillation. I would envisage a combined scheme with distillation plant on one of the larger works with a tanker service by which all crude tar from the gasworks would be collected for processing. At the moment supplies of crudes may not warrant such an arrangement, but with proper development greater quantities would be available.

In the past and even more now, the Irish gas industry suffers by being compared to the very much larger gas industry in England and by virtue of the fact that the large industrial demands and greater density of population make it possible for schemes to be visualised and carried out which in our circumstances require more thought and preparation before being embarked upon. This should not dismay us or lessen our enterprise. Denmark and Holland are small countries but by resolutely facing their problems in agriculture and industry they have more than held their own in competition against the large countries, and I would say that whatever the cost our policy in the Irish gas industry must be the traditional one of our industry, namely, that of giving only the highest service to consumers.

Finally, I would like to commend to you the moral of the story when a 'backroom boy' was asked to deal with an almost unsolvable problem in the second world war, he replied, 'If the task is very difficult it will take a little time, if it is impossible it may take a little longer.' So even should it 'take a little longer' in meeting some of our difficulties, the problems must be tackled with courage and tenacity, and thereby ensure that our great industry shall be greater yet.

Gasification Plant Developments

PAPER TO THE IRISH GAS ASSOCIATION, SEPTEMBER 22, 1954, BY

N. J. ROBERTSON,

A.C.A., Assoc.Inst.Gas E., Alliance and Dublin Consumers' Gas Company.

It is common knowledge that the coking and gas coals of Great Britain upon which the gas industry of Ireland also depends are being utilised at a disproportionately rapid rate. We are warned that anticipated future coal production in Britain has a progressive trend towards lower availability of coal suitable for carbonising. The position relating to natural fuels, and the absence of indigenous coal resources in Ireland, make it doubly important to be well informed on plant developments. It is well, therefore, that the matter of gasification, which in the last decade has been the subject of considerable research in many countries, should have a place in our discussions.

Publication of the O.E.E.C. Report in February of this year relating to the objectives of the international working party set up to promote the increased thermal efficiency of solid fuel through gasification enables an appreciation to be gained of the basis on which this work is being approached. It will give an insight into the considerations affecting the latest techniques of fluidisation and particles in suspension, together with the important earlier fixed bed processes. This paper, however, purports to deal more specifically with processes which have reached a commercial stage and on which further information became available at the conference on total gasification organised by the Belgian Coal Institute and O.E.E.C. in Liège in May of this year.

Total or integral gasification, which is significantly different from distillation, not only in the chemistry of the up-grading, but also because there is no solid residue, other than ash, after the volatiles have been driven off, is not novel or a recent development. Producer gasification of coal for industrial power, the Mond producer for ammonia by-product recovery with steam saturated air blast, cyclic water gas practice, the Tully system, etc., were established commercially prior to the commencement of this century. These original plant processes are clearly the basis from which present-day refinements have been developed, stimulated by the prospect of increasing net thermal efficiency and widening the range of fuels which can be effectively gasified.

Marked Differences

Processes suitable for town gas supply must normally meet the requirement that the gas produced is similiar in essential characteristics to gas already supplied in any given region, particularly as regards calorific value and specific gravity. The requirements in this country and Great Britain are similar, but marked differences exist between us and other countries. Furthermore, the types, costs, and availability of fuels and conditions of demand differ. Consequently, research and development of gasification techniques in various countries have been affected by such differences. Significant in this connection was a paper submitted at the conference by L. L. Newman, Engineer of the Bureau of Mines, U.S.A., which evidenced the marked emphasis of U.S. research on high pressure oxygen processes and, because of the strongly caking coals nearest American industrial areas the interest in pulverised coal gasification in entrainment under pressure. On the Continent, however, greater attention is directed to air/steam processes and the use of low grade fuels, such as brown coal, lignite, coke breeze, and high ash and moisture coal fines.

Opportunity to examine the position on the international level is both interesting and informative and demonstrates the value of such conferences being organised from time to time. The number of different processes for total gasification reported are now almost too many to list. However, the majority have little practical importance for us. Most of them produce low calorific gas of more use for chemical works or application in iron works than for gas supply, or gas for synthesis. Such processes may be of interest to gas undertakings, however, if they enable producer gas for furnace heating, made from cheap fuel, to be substituted for gas now made from more valuable fuel.

In classifying these processes the most significant division is between those (a) in fixed beds at atmospheric or high pressure, and (b) in fluidised beds and in suspension. As compared with carbonisation—which, from even the most suitable coal yields only 25% of its heat value as gas—efficient gasification of coal substantially translates the entire thermal energy of the coal to gas and demands approximately only one-third of the coal required in carbonisation to produce equivalent outputs. Processing is fundamentally based on the chemical reaction of carbon with oxygen and steam. Theoretically, carbon can be converted into gas exothermically by direct oxidisation or endothermically by the reduction of steam and carbon dioxide. It is the control of the reactions with given fuels and under practical conditions which determines the effectiveness of the conversion.

Factors of temperatures and pressures in the reaction chamber, reaction speeds, diffusion of the reaction and product gases, considerations affecting the concentration of injected air-steam or oxygen-steam, and how the flow of fuel and reaction gases is arranged, etc., are essential features in the exercise of such control, but are not suitable for consideration here.

Coming to what is of direct interest to us, two processes discussed at the conference, both of the fixed bed type, are worthy of special description. Each has reached the stage of commercial application and both must be considered as proved installations suitable for base load supply in the correct circumstances. Firstly, there is the Lurgi plant operated at high pressure with oxygen, and, secondly, the air and steam cyclic process incorporating carbonising and predistillation chamber.

The Lurgi Process

The Lurgi plant has been developed during the last 25 years and is claimed to be capable of producing a town gas with gross calorific value of up to 460 B.Th.U. per cu.ft. The process incorporates a conventional rotary grate producer but works under pressures up to 440 lb. per sq. in. with a mixture of pure oxygen and superheated steam. The coal is introduced through a lock chamber at the top of the generator. The gasifying agent, which consists of steam and oxygen, flows upwards. Ash is removed through a lock chamber at the bottom of the generator. The crude gas leaving the generator is washed and pre-cooled in a spray cooler.

The gas is further cooled under pressure in tubular coolers whereby, apart from steam, the by-products tar and oil are condensed and recovered. Then the benzole in the gas is removed in an oil washing tower and recovered by distilling the washing oil.

The carbon dioxide in the gas is washed out with water under pressure. A high pressure pump supplies the water to the washing tower where it takes up the carbon dioxide. It then expands in a turbine, releasing carbon dioxide and a small fraction of combustible gases. Part of the power consumption of the pump is recovered in the turbine. Simultaneously most of the hydrogen sulphide is removed from the gas in the water wash. The water is aerated in an aeration tower and returns to the washing tower through the high pressure pump. The gas released from the expanding water, together with the crude gas from the coal lock chamber, is used for superheating the steam required for gasification. The gas leaving the water wash is freed from traces of hydrogen sulphide by passing it through iron oxide or Lux-masse in a dry purification plant.

Until recently a limitation on fuels and, consequently, calorific value was imposed by inability to control the passage of gases through the fuel bed when using caking coals. Recently a design of rotary stirrers which prevent agglutination and continuously maintain the fuel bed in granular form has been developed. In sustained experiments over two and a half years the Lurgi Company has established that fuels of almost every character can be gasified efficiently. Apart from a minimum size of 2 mm. ($\frac{1}{8}$ in.) the use of these coals was limited only by their caking power. Now, due to the new stirring device, coals with agglutinating power equivalent to a British Standard Caking Index of 10 can be handled by the plant. It is also claimed that considerable progress has been made in raising the output of the producer units. In earlier plants the output of a unit with a diameter of 8 ft. gave normal output of 180,000 cu.ft. to 250,000 cu.ft. of crude gas an hour at S.T.P. New measures to ensure uniform fuel distribution which also enabled the refractory lining of the vessel to be dispensed with, thereby increasing the useful cross-section, have raised the outputs of 350,000 cu.ft. with typical coals to 420,000 cu.ft. of crude gas an hour. Larger producers have also been developed with a diameter of 12 ft. and with an hourly gas make of 700,000 cu.ft. to 800,000 cu.ft. These large capacity units have proved satisfactory, and a substantial battery of this size is stated to be under construction for installation in South Africa. It is evident that the value of these improvements in terms of unit output of grate area must result in both lower capital cost and improved operating costs.

Liberty is taken to reproduce here data, submitted at the Liége conference, relating to production trials with English and Scottish coals.

	English West Midlands Coal		Scottish Bogside Coal	
Moisture, %	7.5		8.4	
Ash, %	7.5		28.5	
Fixed carbon, %	49.6		38.4	
Volatile matter, %	35.4		24.7	
Tar content (Fischer assay), %	12.26		5.7	
Sulphur, combustible, %	1.10		1.3	
Gross C.V., B.Th.U./lb.	—		8,340	
Grading, mm.	10-30		10-30	
Ash fusion temp. (Leitz blobbling temp.), °C.	1,495		>1,500	
Gasification pressure, lb. per sq. in. gauge	301		294	
Steam-oxygen ratio, lb. per 100 cu. ft.	37.5		40.7	
Gas analysis:	crude	clean	crude	clean
CO_2, %	28.9	2.0	30.5	2.0
H_2S, %			0.5	—
C_nH_m, %	0.3	0.3	0.2	0.2
CO, %	19.5	26.9	17.4	24.7
H_2, %	40.7	56.2	42.5	60.3
CH_4, %	10.1	13.9	8.4	12.1
N_2, %	0.5	0.7	0.5	0.7
Gross C.V., B.Th.U. per cu. ft.	—	410	—	395
Throughput, raw coal, lb./cu. ft. per hour	178.5		229	
Gas yield, crude gas, cu. ft./lb. raw coal	30.9		22.3	
Gas yield purified gas, cu. ft./lb. raw coal	22.5		15.4	
Oxygen consumption, cu. ft./cu. ft. crude gas	0.1340		0.151	
Chem. energy in gas cu. ft. of O_2 used, B.Th.U.	2,370		1,920	
Steam consumption, lb./100 cu. ft. crude gas	50.2		6.20	
Gasification efficiency (coal basis), %	91.3		87.9	
Tar yield, % of assay yield	62.2		74.7	
Tar oil (sp. gr. 1.0*), gal./ton coal	14.11		6.61	
Light oil (sp. gr. 0.88*), gal./ton coal	4.84		2.80	

* Specific gravities assumed for conversion to B.I. units—Translator.

It will be seen that with a medium quality West Midland coal, after the CO_2 elimination by high pressure washing, the calorific value of the gas was 410 B.Th.U. per cu.ft., equal to a yield of 50,000 cu.ft. per ton (60,000-63,000 cu.ft. is claimed with more suitable coal). It is stated that the new anti-agglomerating device will allow coals with higher coking indices to be gasified with consequently improved calorific value of the gas up to 460 B.Th.U. per cu.ft.

A substantial drawback to possible application of the process to the Irish gas industry, however, is to be found in the requirement of bulk oxygen.

The Gas Integrale Process

Coming now to the air/steam cyclic processes with predistillation generators, communications presented at the conference related to the Gas Integral installation at the Rome gasworks, and plant in development by the Power Gas Corporation, Ltd. Opportunity was also afforded by courtesy of Gaz de France to investigate the Gas Integrale installation at Vierzon, which incorporates gas oil cracking.

The main features of the process are common to the plants generally and particulars and explanations, except where stated, are general. Coal gasified is normally high volatile with a maximum on the B.S.S. Swelling Index of 4. Efficiency is higher when the size of the fuel is more regular and the percentage of dust is low. The best size of fuel is stated as between 40 and 70 mm.

The essential vessels of the process where oil enrichment is provided are: (1) Combined generator and distillation retort, (2) superheater, (3) carburettor, (4) cracking chamber, (5) combustion chamber, (6) spray washer, (7) hydraulic seal, (8) condenser, (9) hot electro-detarrer, (10) cold electro-detarrer, (11) steam drums, and (12) turbo air blower.

The units at Rome, which are worked in conjunction with continuous vertical plant, are each of 2 mill. cu.ft. per day capacity of double gas (mixed distillation and water gas). The generators, of 3 m. (approximately 10 ft.) diameter are of mild steel refractory lined, and are divided into four compartments by radia partitions. The lower part is provided with an annular jacket boiler and the lining and radial walls are designed to contain a system of flues through which the hot blast gases circulate. There are four distillation chambers, each having a segmental shaped cross-section of a little less than 1 sq. m. (9 sq.ft.) and a height of 5 m. (approximately 8 ft.).

Fuel Charging

Fuel is charged automatically and is controlled by feeler rods operating on the coal level in the chambers. The throughput is around 40-45 tons daily dependent on the grading of the fuel used. The heat of the blow gases given up to the refractory work helps to carbonise the coal, but the main distillation is affected by the sensible heat of the run gases through the fuel.

Ash extraction is by hydraulically driven rotary grate. Blow gases leaving the generator pass to a regenerative superheater, or where the plant is carburetted they divide between the superheater and oil carburetting chambers, where they burn with secondary air to heat the checker filling. Temperatures in the superheater, carburettor, and cracking chamber at the commencement of the run were 850°, 800°, and 710°C. respectively. The divided blow gases from superheater and cracking chamber rejoin before entering the combustion chamber, where they burn with a further addition of air before passing to the waste heat boiler and out of the system.

Figures supplied of steam requirements show that under normal conditions of operating the process is self-supporting or provides a surplus of steam for process work. On the gas-making run in uncarburetted plants the mixed distillation and water gas (double gas) passes directly to the washing and cooling units and the final calorific value may be expected to be 330-335 B.Th.U per cu.ft. Where oil is added to the gas, the mixed gas from the generator passes up through the checkerwork of the carburettor in counter-direction to the downwardly injected oil. The enriched gas then passes on to the cracking chamber for fixing. The gas, enriched to town standard of 450-500 B.Th.U., is spray-cooled and passes in turn to the hydraulic seal, the electro-detarrer working at about 90°C., the condensor at 18°C., and thence to a low temperature detarrer to remove entrained oil. The normal cycle on the carburetted plant is 5 min. 27 sec., of which the blow accounts for approximately 28% and the run 55%. Where oil enrichment plant is not installed the cycle is faster, the average time being 4 min.

While no actual or anticipated production costs are available, cost indications could be based on a yield of 53,000 cu.ft. of 450 B.Th.U. gas per ton of coal (15%-18% ash and moisture) using 1 gal. of oil and 2.2 kW of electricity per 1,000 cu.ft of gas.

Tar production similar to continuous distillation quality should be estimated at 12 gal. per ton of coal treated. The thermal efficiency of gas production at Vierzon is calculated at 64.3% and the total thermal efficiency is claimed to be 76.2%. On the Rome plant the corresponding figure is 74%.

Limitations on fuel which can be utilised in the process are greater than in the oxygen high-pressure processes. Fines, coals with B.S.S. Swelling Index over 4, and, in general, very low quality coal cannot be used efficiently. Nevertheless, a great proportion of the coal mined in Great Britain which is unsuitable for carbonisation could be utilised for gas supply in such plants; and flexibility in the size of the units which can be installed makes the process a practical alternative to carbonisation, more especially where the demand is of modest order.

In conclusion, I record my thanks to the Directors of my Company for the opportunities readily afforded me for inspection of plants and attending conferences, to the Gaz de France for the courtesy generously granted to inspect the Vierzon gasification plant, and to M. Maisonnier, of Usine de Gaz, Vierzon, who made my visit both pleasant and informative. I wish also to acknowledge the assistance obtained from the following authors and papers contributed to the Liège conference; O. Hubmann, 'Advances in the Technique of Gasifying Fine, High Ash Coal under Pressure.' L. L. Newman, 'Developments in the Oxygen Gasification of Solid Fuels on the American Continent'. P. M. K. Embling, 'Gasification of Coal in Producers and Water Gas Generators'. Dr. M. A. Spaggiari, 'Four Years Experience with the large Total Gas Plant of the Rome Gasworks'.

Strictly Business

Scottish Association Discusses Mr. R. J. Gregg's Paper

Following is our report of the discussion which arose out of the presentation to the Scottish Association of Gas Managers on September 16 by Mr. R. J. Gregg, Publicity Manager of the Gas Council, of his paper which he entitled 'Strictly Business.' (An abstract of the paper was published in the 'JOURNAL' of September 22 (pp. 702-704)

Mr. W. C. Campbell (Paisley) said Mr. Gregg meant to drop a bomb and would have been disappointed had it not gone off. Perhaps it should be described as a fire-cracker! They applauded the efforts of Mr. Gregg and his publicity people. Sales of domestic gas equipment must be breaking all records and they must give credit where it was due. It was not for them to judge the merit of the professional salesman, and Mr. Gregg need not bother unduly about what they thought of his advertising methods. If these brought more and more people into the showrooms and they grasped the opportunities so presented, the results would show the success of his methods. Mr. Gregg had said 'Consumer expenditure is devoted to satisfying three primary requirements—food, clothes, entertainment.' Surely heat, light and power should be included prior to entertainment. It was for a share of that part of personal income that they competed, primarily, with the other fuel supplying industries and, secondly, with entertainment (a means of dissipating income). Did Mr. Gregg foresee any danger of increasing appliance sales reducing gas sales, bearing in mind that the householder could afford to pay only so much from income for fuel and fuel-consuming equipment? Would he look for the extra salesmen he wanted in the ranks of their skilled gasfitters or outside the industry? If the latter, what form of training would he prescribe?

Mr. Gregg had forgotten that they had operated as manager-cum-sales administrator at a time when money for sales promotion was not so available as now. In Scotland the manager of most undertakings had been more preoccupied with selling gas and meeting competition than with engineering. A state of 'energetic and virile competition' was nothing new. For an Englishman to penetrate so deeply into Scotland to say these things to the Scottish gas manager required courage. Perhaps Mr. Gregg had brought the wrong paper to the meeting after all!

A Man with a Mission

Mr. David Fulton (Helensburgh) said that in former times, after Mr. Gregg had delivered a paper, he had broken a lance with him often. He now wanted to offer some kindly criticism of the way the argument had been presented. Mr. Gregg appeared before them as a man with a mission, presenting his case with zeal and fervour to an audience not requiring to be converted to a realisation of the value of a salesman in any well organised trading undertaking. It was questionable if the lashing of the gas engineers with whips and scorpions would commend the author's premises. He did not think that Mr. Gregg would care very much because a true zealot was not interested in other people's views, but only in disturbing and awakening the minds of his hearers. The strictures contained truths and half-truths and the latter had been defined as distortions of exactitude. Sweeping assertions were part of Mr. Gregg's stock-in-trade. He had given them some sense wrapped up in nonsense and some nonsense masquerading as sense.

They would all agree that salesmen should possess personality and a natural aptitude for selling. Training would increase and enhance these qualities. He deplored Mr. Gregg's scathing references to the Institution's training course for salesmen. Whether it was good, bad or indifferent—and many aspects of it were good—it would enhance the salesman's value. Mr. Gregg, dealing with advertising, suggested it carried much falsehood but his point was 'Advertise or Perish.' Propaganda had many evils but they had to accept advertising as a necessary evil out of which some good might come.

Mr. F. Kerr (Elgin) said that during the reading of the paper he had mixed feelings of agreement, indignation, disagreement, and again agreement. He gained the impression that Mr. Gregg did not like engineers. He referred to 'salesmanship as nothing more than applied commonsense,' and later to the fact that 'salesmanship is not a job for amateurs.' He resented that 'it is the gas engineer who, to a considerable extent, directs the sales administration of our industry, a task for which he is neither competent or capable of effectively discharging.' The implications were that the gas engineer was an amateur and lacked commonsense. The districts in the Scottish area were mainly medium, small, and very small in size; thus it fell on the district manager to direct the sales administration of his own district. It did not appear that the near future, or for that matter the more distant future, would bring any change in the position. The area was too scattered, the units too numerous, to make an immense sales organisation, centrally controlled, a practical possibility. The sales manager who was a success at directing sales in, say, Glasgow, might be a complete failure with the people of the fishing villages on the north-east coast.

The Urgent Need

The urgent need was not for sales managers, but for salesmen familiar with the local people and operating under the district manager, in as many districts as could fully occupy them. There were few districts that could fully employ such a salesman. While there were dear old and deadly diehards in the industry, there were many young, and not so young, engineers doing a good job and showing good results in the field of salesmanship under extreme difficulties. Where that keenness existed, the appointment of a salesman would add that extra zest in sales and give every employee in that district the added pleasure derived from a job well done. In his own district he had no employee trained in salesmanship, but he had several with considerable interest in the industry, who by their combined efforts, were showing excellent results. From his own short experience, he had found that the best way of attracting sales was to take the appliance as close to the area under attack as possible.

They had a good showroom in Elgin, centrally situated, but today they could not wait for people to come to the showrooms. Exhibitions had been held in four different housing areas with the surrounding householders being visited a day or so before the exhibition. There was no suitable hall for the first exhibition and so it took place on the banks of the River Lossie with the ancient monument of Elgin Cathedral in the background, providing a distinct contrast to the modern appliances, tastefully displayed. At later exhibitions halls were available. At no exhibition had the people more than 100 yards to walk to see the display. The four exhibitions had excellent immediate results and had snowballed to such an extent that they were too busy to consider holding a fifth. His present desire was for a mobile display—not a travelling showroom with all its folding platforms, etc.—but a large van with sufficient area of glass to allow good light to display a few varied appliances.

Mr. Gregg referred to the desire for uniformity in the selling prices of their commodities. He regretted that, in its first step towards that, the Scottish Gas Board raised the selling prices of appliances in the majority of districts to

that price which the larger districts claimed was necessary to cover their sales expenses. The consumer in the small district with no showroom, or where the showroom also served as the office, had to pay the high city price for appliances as well as the high country price for gas.

Mr. T. A. Ross (Fraserburgh) said good advertising should arrest the eye by means of slogan or illustration. Some recent advertising arrested the eye—they were dull and drab, and when he saw them he could not turn the page over quick enough. 'Is Health Corked in a Bottle?'—made one think of one's last illness right away. If one covered the bottom half of the page where the 'Does the Clock Rule your Life?' and 'Are your Hands always on your Mind?' advertisements were shown one would see a good lady waiting for her husband coming home at 11.15 p.m.—the hands 'nursing her wrath to keep it warm.' Mr. Gregg's excuse for these advertisements was to ring the changes; he trusted in future he would get something better with which to ring the changes.

Recently, when canvassing prospective tenants of a new housing scheme it was found that the lady of the house preferred gas, but the man wanted electricity as he did the paying. It was all very well to say he did not do the cooking, but that was what they were up against. Future advertisements should appeal to both men and women.

He would like Mr. Gregg to brighten up the Gas Council posters; they were too dull, some of them not even fit to be displayed. They should have the word gas more outstanding and keep Mr. Therm in the background. He agreed with many of Mr. Gregg's remarks regarding showroom selling of appliances but when would they reach the happy medium? In some of the larger places consumers were almost frightened to enter the showroom because they knew the high pressure salesman was sure to sell them something. In the smaller places where there were no salesmen the consumer had to make do with a lady clerk or a manager; during the time they were selling appliances they were thinking about the return which should have been sent in two days ago. Some of the money spent on advertising should be spent on educating the fitters, collectors, clerks, etc., on the sale of appliances.

Humorous Author

Mr. C. B. S. Mitchell (Kilmarnock) said if the success of a paper was measured by the interest it created, then Mr. Gregg must be awarded full marks. Mr. Gregg had many sterling qualities, but paramount among them was that of humorous author. Even the diehards among them had been forced to recognise the wisdom of the saying—sell or go broke. Much though it hurt, they were fast becoming accustomed to the idea that vast sums must be provided each year to offer up at the advertising altar. Advertising paid—so they said—but they in turn had to pay also—through the nose. While agreeing with the doctrine which Mr. Gregg preached so eloquently, he must, at the same time, express a little sorrow at the need for the utility undertakings to climb on the high-pressure sales and advertising bandwagon, along with makers of soap powders, deodorants, two-way stretches and Marilyn Monroe. How much happier they would all be if economic necessity compelled the other of their great fuel industries, coal, to climb up beside them and proclaim the virtues of their product. The very fact that they were not there, nor ever likely to be, was, to his mind, one of the greatest tragedies of our post-war economic life. The engineer, the salesman, and the accountant were complementary to each other and working in harmony could achieve much, but until now, any successes they had won had been vitiated immediately by yet another increase in the cost of coal.

The salesman could sell appliances till he was blue in the face (assuming, of course, that they had, or would have, the labour force to fix them all), but it would avail them nothing at the end of the day, if gas had priced itself out of the fuel market. One might feel inclined to counter with the argument that the same applied to the electrical industry, but thermal generating stations were stepping up efficiency by leaps and bounds, and, in addition, were being equipped to burn the cheapest grades of coal. The gas industry on the other hand, could only hope for modest increases in production efficiency.

He would like to say a word in defence of the engineer for whom Mr. Gregg appeared to have but scant regard. It was more true today than ever before that 'profits are made in the retort house' and with coal at £4 per ton, every extra therm the engineer could squeeze out was going to play a major part in the battle to keep the cost of gas within reasonable limits. No amount of selling by Mr. Gregg and his boys would offset inefficiency on the part of the production engineer.

Mr. Alex. Jamieson (Western Group) said he had seldom heard so much nonsense spoken in his life. He could not understand Mr. Gregg's attack on district managers. Any success the gas industry had in the past was due to the local connections of the manager or gas engineer. But for these good men there would have been no business for them today. It was they who built up a good connection. They were now getting opposition but they were meeting it. In the Western Group, without any salesmen, the sales of appliances for the first four months of the year showed a 50% increase over last year. He did not know what Mr. Gregg considered good business, but felt they were not doing badly. They had appointed four salesmen drawn from their fitting staff and hoped to maintain and increase the business. He would like Mr. Gregg to tell him if they were on the right lines by appointing these men. The attack Mr. Gregg had made on gas engineers was unwarranted, and he hoped that before the end of the day he would apologise!

Posters Criticised

Mr. R. Cowie (Hawick) said that Mr. Gregg had a reputation. He was at the head of his profession and therefore they welcomed him. He agreed with what Mr. Fulton had said about the paper. 'As a gas engineer I am proud to be called an amateur in salesmanship because an amateur is one who loves the job and does it for the love of it.' He had always observed one or two cardinal rules about salesmanship, but Mr. Gregg broke them with impunity. One had to show some respect for the potential purchaser and speak to him in his own language, but Mr. Gregg simply insulted them, while trying to sell them something! Some of the national advertising of gas was negative, and posters came to them which were merely fit for the waste paper basket.

Mr. G. Wood (Galashiels) said he realised that a salesman should be something of a psychologist and should be able to assess the prospective customer and so determine the right line of approach. It was important that a salesman should treat every prospect as an individual. On that point, he did not know whether they could consider Mr. Gregg a good salesman as he assumed or insinuated that they were engineers. They were, in fact, an association of managers and had read and discussed, on previous occasions, addresses on salesmanship, although Mr. Gregg might not consider them as such. He had, therefore, arrived with the right paper at the right meeting. Mr. Gregg advocated that the sales side of the industry should be run by salesmen. Did he favour the divorce of the sale of appliances from the other sections of the industry, with separate accounting, so that the profit from sales of appliances was not credited to the cost of gas? Similarly, with that arrangement, the sale of appliances would not be subsidised from gas sales. He had stressed that in advertising it must be all or nothing, apparently with no limit on costs. Surely there must be an economic limit to the expenditure on sales, and it must be apportioned between national Press advertising, local Press advertising, films, showrooms, &c.? The proportion of money allocated to each must surely be varied according to an assessment of the importance of each? While there must be national advertising, even if it was of the nightmare quality of the Gas Council's advertisements, much more should be spent on local advertising where details of actual appliances were given with prices. Advertising value was increased if it was considered and suited to the tastes of the people to whom it was directed, just as showrooms must be decorated and arranged to suit local conditions. The importance of the showroom could not be too highly stressed. Until they all had mobile showrooms or folding appliances which could be taken from door to door and as long as the customer wished to see an appliance before purchase, the showroom was the most important part of an undertaking. Here the final sale was made, and it was also literally the shop window for the industry. No matter how much was spent on advertising, the public assessed the industry on what they saw locally, and a poor showroom would dull the effect of good advertising.

Provision of Incentives

Provision of incentives to sales staff was a widely debated issue in the gas industry, but why did they give an incentive to a plumber for introducing business and yet not give it to a gas fitter or collector or any person in their employment? It was not a stoker's work to sell appliances although his work depended on it. They had a good arrangement with ironmongers to assist in the sale of appliances, and they were paid a good percentage just for introducing business. Strangely enough, the ironmongers did not seem to have realised what a good agreement they had with the Gas Board. If they took the sale of gas appliances seriously, they could work their fitters off their feet and, at the same time, put the industry and themselves on their feet.

Mr. A. Bujnowski (Glasgow) said he was not a district manager and therefore had not been hurt! No matter what they felt about the paper it had conveyed to them the real

(*Concluded on page 803*)

Distillation of Scottish Coals

PAPER TO THE SCOTTISH ASSOCIATION OF GAS MANAGERS, SEPTEMBER 16, 1954, BY

C. A. POULSON,

M.I.Mech.E., M.Inst.Gas E., F.C.S., West's Gas Improvement Co., Ltd.

Having shared with you some long association with gas manufacture in Scotland, my choice of subject naturally follows that of carbonisation of Scottish coals, and I propose also to enumerate some future trends towards their more economical treatment in gasworks.

Due to the high efficiency of present processes, the margin to decrease production costs has become increasingly narrower. Despite this, the main hope for further economy would appear still to rest in the retort house. The efficient distillation of coal has always been the foremost endeavour of the gas industry, and the problems confronting it cannot diminish with advancing costs of coal, labour, and freight. Their cumulative effect on manufacturing costs will become more pronounced, accompanied by severe competition from electricity and oil which is likely to increase, and it would seem that our industry is due for further development in gas production, to reduce the cost into holder and to offset the prevailing high capital charges.

The electrical generating stations of this country are being extended and modernised at immensely high capital cost, and if we are meeting sharp competition now, much more can be expected when electricity ultimately overtakes its loads.

The gas industry today needs to employ its present capital to the fullest extent by increasing the gas-making capacity of the plant already available, and at a later stage in this paper, outline some experiments with gas injection, a subject on which there has been much recent discussion.

Forty years ago, carbonising technique was transformed by the introduction of vertical retorts. Some years later 'steaming tests,' investigated in its early stages by the Fuel Research Board in Scotland, endowed the gas industry generally with a new impetus towards higher production efficiency, and a reduction in manufacturing costs. I propose to set out gas production costs at the various calorific values when treating Scottish coals in continuous vertical retorts, using the steaming process, and later shall endeavour to draw a comparison of results on similar bases when admitting blue water gas to the retorts instead of steam. Endeavour has been made to state the main details clearly, so that your own figures can be inserted for comparison, as obviously each works must be considered entirely in the light of its own local and varying conditions.

The modern tendency has been inclined to develop and increase gas production centres on the assumption that the greater output will produce the cheaper therm. It is by no means true that gasworks efficiency lies only with the larger unit, and that the larger undertaking is necessarily the cheaper production centre. There is, however, a certain capacity, large enough to carry the necessary technical staff and equipment to ensure optimum control and efficiency, at which the best results are obtained.

The gasworks of Scotland produce some 200 mill. therms annually, and if it were possible to reduce the cost into holder by as little as one farthing per therm, the saving to the Scottish Gas Board would amount to over £200,000 a year.

Scottish Coals

Shortage of mined coal in Great Britain is indeed a serious handicap to her economic position, and the more humiliating when realising that we previously exported coal to the very countries from which we must now buy it. It is, however, intended to deal only with Scottish conditions, and, the first step in the consideration of the gas manufacturing process and costs is to review the position of the coals available in Scotland. In future years the Scottish gas industry will have to process an increasing quantity of the weakly coking varieties, as the new mining projects of Fife develop, and as doomed pits in Western Scotland, which have served so well in the past, go out of production.

Scotland has never been abundantly rich in first grade coking coals. With the diminishing coal workings in Lanarkshire, there has been a progressive reduction in the amount delivered to gasworks, and to-day very little is available from these sources. With this fast depletion of coking coals, it will be unfortunate if the decision is carried to abandon altogether the coalfields of Lanarkshire. The closure of some pits may be inevitable, but, for others, despite the possibility that the coal in certain instances may be expensive to mine, the fact remains that Lanarkshire still produces the largest proportion of the best coking coal in Scotland. There would seem to be every justification for the exploration of new pit sites in the area. To write off the coalfields of Lanarkshire means sacrificing that quality of which Scotland is most short, and, in so doing, adversely affect the gas and coking industries alike, the latter being predominantly dependent upon this grade of coal. Britain leads the world in the art of deep coal mining, and it is hoped that this knowledge may yet be applied to Lanarkshire to relieve the famine of coking coals in Scotland.

There has been an overall deterioration in all Scottish coal qualities and those from Fife appear to have suffered most. Several of the well-known Fife coals which were always first-class gasmakers have deteriorated in both quantity and quality. Some Fife coals, however, can still be useful gas-making subjects, and certain seams can produce five or six therms per ton more than average Lanarkshires. The coke produced from these coals, though very reactive, is smaller, of softer structure, and has a high breeze content.

Wider deliveries of this type of coal will be offered, and its efficient treatment will become increasingly important to the Scottish gas engineer, to obtain from it the best overall balance-sheet, with a flexible ratio between gas and coke, to produce the cheapest therm into holder.

The continuous vertical retort is admirably suited to the treatment of the widest variety of coals, and is the most efficient means for the production of town gas from Scottish coals. Capital cost of vertical retorts is lower because carbonising plant capacities are higher with Scottish coals, which have two other important advantages. Their sulphur content is low, ranging only between 1% and 2%, and the very reactive coke produced permits high steaming conversion, producing a high yield of therms per ton at calorific values which can be distributed at reasonable cost.

During the past 15 years, inert content in many Scottish coals has very greatly increased, and, assuming that, for reasons of national urgency, the gas industry is expected to continue to accept and treat these poorer quality coals, this may be accompanied by a reduced plant output, possibly of the order of 10%. In addition, many Scottish coals, if stored for more than a year, could show a reduction of three or four therms per ton, and the coke produced would contain increased fines.

As the prices of coal, labour, and freight rise, it is evident that increased plant production and efficiency must be obtained, improved processes evolved, with more efficient extraction and utilisation of the derivatives.

BENZOLE boosts performance!

For *MAXIMUM* power
— run on National Benzole Mixture — the most powerful motor fuel on earth.

For *MOST* miles per gallon
— run on National Benzole Mixture, containing Benzole — Nature's most economical fuel.

For *BEST* possible smoothness
— run on National Benzole Mixture — for Benzole is the world's best anti-knock spirit.

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In view of the foregoing comments on the qualities we may yet expect to receive for some time to come, it may be of interest to those responsible for retort house operation to chart the gas makes per ton which can be expected when carbonising coals of varying inert content. I have been asked for this information on numerous occasions as a guide to practical working results when treating the poorer coal qualities, to which, necessarily, we have had to become accustomed. The word 'guide' is used advisedly, since there are seams in the various areas which stand out as superior to the general average, and these better coals must have separate classification; but the chart serves as a useful indication in the endeavour to narrow the margin between gas makes which should be possible with Scottish coals from various areas, as against works results at present obtained.

Short of an operational test in a full-scale retort, it may be doubtful whether any accurate judgment can be formed of the gas making results to be obtained from a given coal. A good idea can be obtained from a proximate analysis if this is supplemented by an accurate determination of the calorific value of the coal. Deducting the calculated value of the carbon content and allowing for ash and moisture the calorific value of the volatile content can be deduced. thermal yields of gas at calorific values ranging from 410-450 B.Th.U. Curve 6 in the chart shows results obtained with standard Fife coals and Curve 8 those with Lanarkshire coals.

The markedly better coals available at that time possessed a much higher carbon content, and their ash was low. A higher percentage steaming was possible because the steaming reaction takes place only on the outer surface of the coke pieces, with some slight impregnation, but if the ash content rises steeply, as indeed it has, then the carbon surface is restricted and the effectiveness of steaming is thereby decreased.

Moreover, the manufacture of water gas by 'steaming' can be justified only to the stage of utilising the residual heat in the coke. To go further than this involves the supply of additional heat to the charge with a consequent increased weight of coke charged to the producer, except insofar as the hot gas and unconverted steam rising through the charge has the effect of internal heating such as we have seen lately accentuated in the use of a 'carrier gas' for this very purpose.

Two other important factors are that, as the ash content rises, producer operation is adversely effected, attended with lower heats for conversion. The other, and perhaps more important, influence, is the widely fluctuating com-

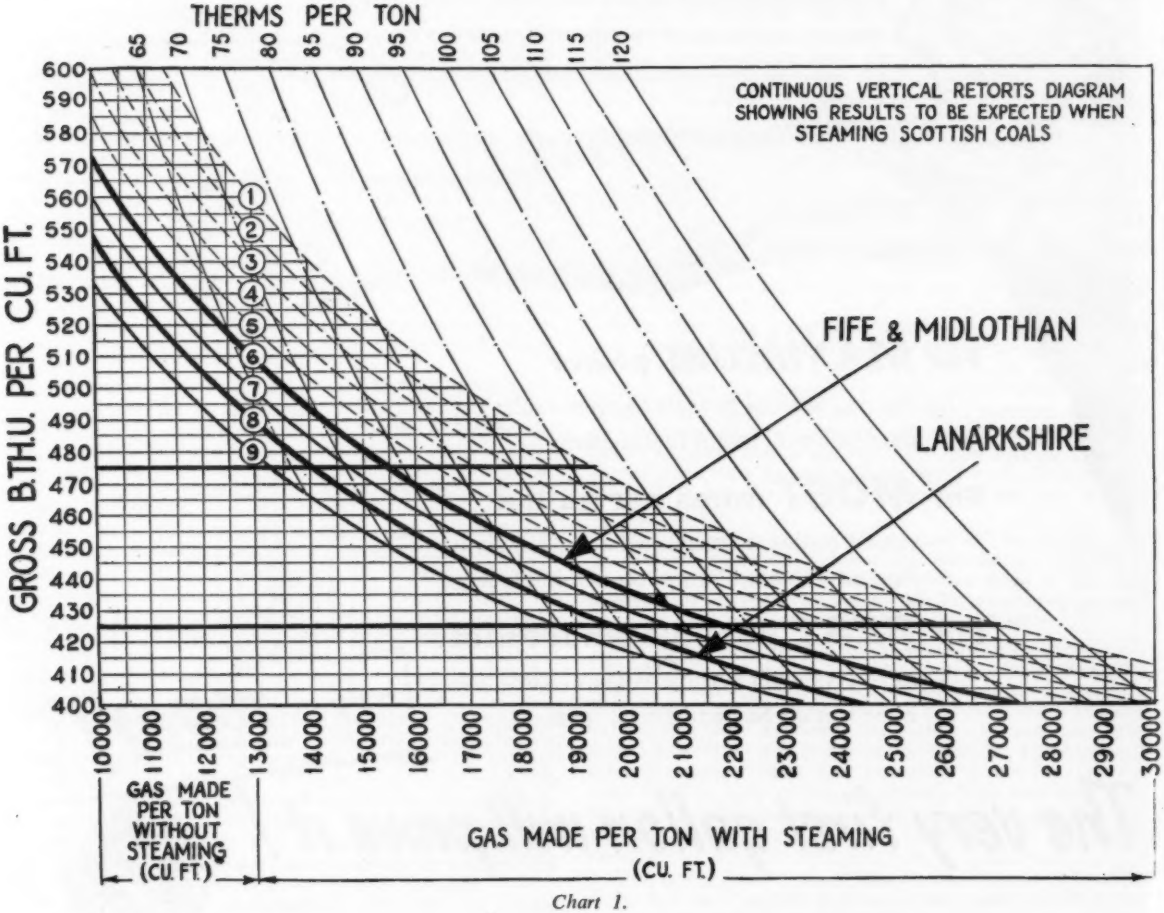

Chart 1.

Chart No. 1 shows the gas makes obtained by the Fuel Research Board when carbonising Scottish coals, of stated analysis, 30 years ago. The results obtained in the exhaustive tests then conducted at Uddingston by the Gas Investigation Committee of the Institution were collated with later tests at the Fuel Research Station, East Greenwich, with tests in the Glover-West research retort at Manchester and with operational results in a number of gasworks in Scotland. All these results were reduced to a common basis of ash plus moisture on curves showing

position of coals received at the gasworks in day-to-day deliveries, rendering steady plant conditions very difficult to maintain. Coal deliveries are generally beyond the control of the gas engineer, but if the number of differing coals delivered to each works could be appreciably narrowed it would considerably facilitate the balancing of carbonising conditions, with consequent improved results.

To provide basic data for the poorer coal qualities now coming forward, additional lines of lower classification are shown in Chart No. 1. There are still certain coals, how-

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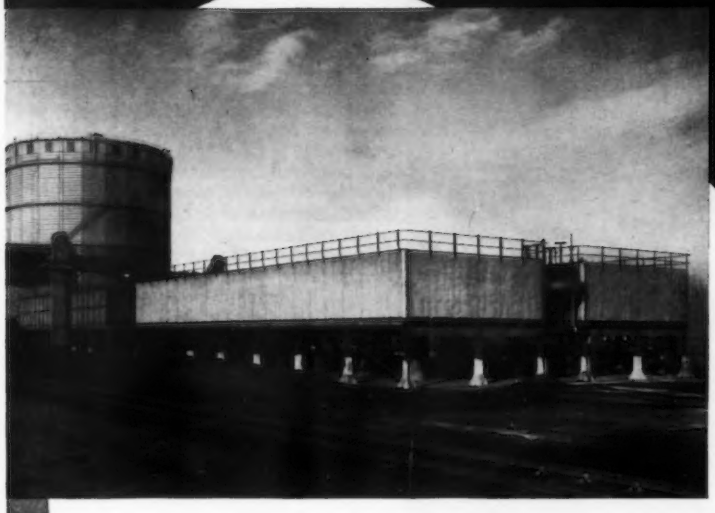

6
Purifiers
30 ft. x 35 ft.
x10 ft. deep and
6, 30 ft. square
x 10 ft. deep with
combined oxide handling plant & cover lifting gear (Waterless (M.A.N.) type Gasholder of 5 mill. cu. ft. capacity also erected by us, in background).

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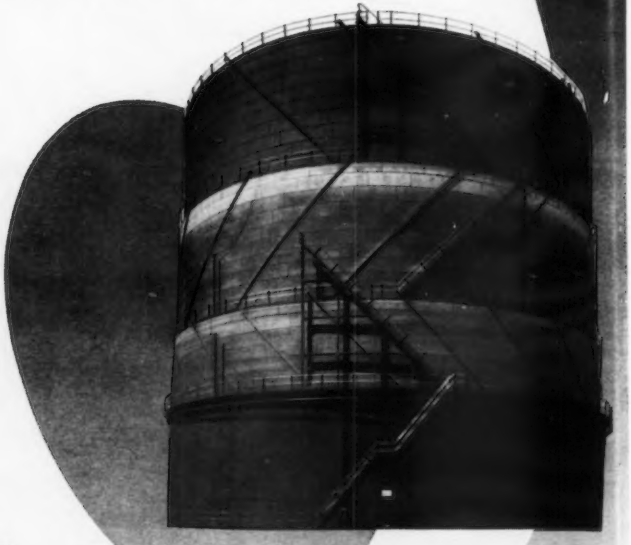

3 lift spirally
guided Gasholder of
1 million cu. ft. capacity in steel tank
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ever, which are of considerably higher quality than average, both by analysis and caking index. These coals must be considered separately, as gasmaking results well above average are possible with them.

Importance of Coke

Coke remains the predominant item in the balance-sheet of a gas undertaking, but it must be admitted that it has been at a discount for the past few years in Scotland. The position in regard to stocks of this, our smokeless solid fuel, is slightly better than it was a year or two ago, when bulging stocks became embarrassing. It is a pity that the term 'coke' carries no indication of its property as a smokeless solid fuel. We are a scientific industry, producing, by scientific means, two forms of smokeless fuel, one gaseous and one solid. Much has been said and written about the pollution of the atmosphere of our industrial cities by the consumption of raw, and particularly bituminous, coals, in the homes of the people. The use of smokeless fuel could do more for the health of the community of this country than probably any one single thing, and we should continue to stress the many economies in life and substance which would follow the extended use of smokeless fuels, particularly in view of the establishment of smokeless zones.

Furthermore, any new aspects of carbonisation of coal must tend towards improving the quality of the coke for sale, both within the process itself and then by efficient screening and sizing of the grades. Coke research has been applied almost entirely where highly swelling coals are available and the fines knit themselves strongly together. To improve the quality of coke from Scottish coals, more control of coal quality and blending is desirable, but the supply of higher index coals is not available in anything like sufficient quantity. The blending of coals in Scotland for the production of a stronger coke, in which many earlier experiments have been made, presents a very difficult problem due to the preponderance of weakly swelling coals. The cost of coal blending, considering erratic deliveries of widely varying qualities of Scottish coals generally available today, may well outweigh the small improvement in the resultant coke. On the other hand, coke produced from reasonable Scottish coals is reactive and free burning and therefore generally suitable for the open domestic grate, if properly prepared.

If the gas industry is to remain a two-fuel industry, it must not allow coke to be regarded as a substitute when other fuels are unobtainable. Apart from the question of price, the necessity of careful preparation of coke for sale in Scotland is becoming more apparent, as a wider choice of alternative fuels becomes available to the consumer. It must be remembered, too, that the consumer pays far more attention to clean, consistently sized fuel, than to its combustion characteristics.

What means are readily available to improve coke quality? It seems to me that there are mainly two:—

First, the production of coke with low moisture content with the important advantages that much higher screening efficiency is possible and that the dust nuisance in consumers premises is eliminated or greatly reduced. Lower moisture content is also essential if a reduction of 'sparking' is to be achieved in the normal grate, for, apart from the presence of shales contained within the coke pieces, sparking is caused mainly by the expansion of steam from the moisture absorbed in the coke.

And second, and in my opinion the best and most immediate treatment for Scottish cokes, is by way of good screening and their supply of a regular size, best suited to the consumer's particular requirement, and well de-dusted. The consumer must not be left to regard coke as an inferior fuel. For the coke sales drive to succeed, Scotland will be forced to these courses, particularly in view of the many classifications of coal delivered and the consequent wide variations of coke sizes produced from them. This need not involve expensive coke preparation. In fact, in many instances, simple plant addition, with the establishment of a carefully maintained routine, could do much to improve coke quality in the many smaller works where no form of mechanical screening equipment is available.

Increased consumption of the smaller coke fractions in works processes, both in the producers and by installing breeze burning equipment to boilers, would release a greater percentage of large coke for sale at the higher price which would be favourably reflected in the works balance-sheet. The gasification of low-grade coal for heating retort settings must also receive further experiment. This is particularly important where non-caking coals are used, and the coke produced is small, as with Fife and Lothians. The extent of interest to be shown in this suggestion must depend upon the ability to purchase the inferior material cheaply.

Declared Calorific Value

The subject of calorific value is a major consideration in any discussion concerning a cheaper therm, and the other important factor is that of solid fuel production to match, as near as possible, the prevailing market, since the coke market still remains the sheet anchor of our production costs.

The problem of the selection of the declared calorific value at which gas has to be made and distributed is one of some complexity. The number of widely varying calorific standards previously in use indicates the diversity of opinion which existed on a matter of vital importance. Indeed, one would think that the declared calorific value was a matter of taste rather than a figure which could be determined on scientific principles. But one can now foresee the standardisation of calorific values, at least in the several areas. Considerable data is available, and by breaking down the figures to standard sets of conditions we can arrive at the gas quality best suited to a particular area or district.

I say area or district advisedly, because the most economical calorific value at which gas can be made is very largely determined by the rank and properties of the coals available. Apart from the financial balance between coal costs and coke prices it is obviously advisable to make as much gas as possible per ton of coal consistent with keeping up the thermal output per retort. Fortunately, nearly all the gas-making coals available in Scotland are such that steaming can be carried down to 400 B.Th.U. without any falling-off in the thermal output per retort. It is as well to remind ourselves that this is not so with many English coals and that from the general technical angle the most economical declared calorific value would be at some point whence the maximum thermal output per retort would be obtained, consistent with the standard make per ton at that calorific value.

The correct gas quality, then, to supply in a particular area must be that which produces the best overall financial result; in other words, that which produces the cheapest therm. A balance must be struck between the gaseous therms sold yearly and the annual solid fuel requirements of the area. Other factors which must be taken into account are the amount of coke oven gas purchased and the quantity of water gas production to meet peak loads. But the two decisive figures will be the yearly gas output and the annual sale of coke.

(To be continued)

WELDING RESEARCH

The aims and an indication of the scope and achievements of the British Welding Research Association are given in an interesting and attractively illustrated brochure just published. It is explained that the Association is a co-operative research centre for all British companies and organisations interested in welding, whether as manufacturers or users, and that there are already over 300 registered members, including 'group' members. Income from members is supplemented by a proportionate grant from the Department of Scientific and Industrial Research, additional income being derived from contracts placed by various Government departments for special research projects. The Association is self-governing under a Council elected by the members, assisted by a Research Board, a Finance Committee, and some 30 technical committees which direct the researches. Briefly, its objects are to carry out research on problems connected with welding, to encourage research by others, and to co-ordinate, for its members, information concerning developments. Copies of the booklet can be obtained on request to the Director of Research, British Welding Research Association, 29, Park Crescent, London, W.1.

Chambers of Commerce Discuss Fuel

Policies and Price Structures

On September 14 and 15 there was held in Sheffield a conference of members of Chambers of Commerce to discuss dispassionately, from both policy and technical aspects, the best use of fuel in the immediate future and the years ahead. The conference was under the auspices of the Association of British Chambers of Commerce and was presided over by Mr. G. M. Flather, Chairman of the Association.

Official opening of the conference was by the Deputy Mayor of Sheffield, Councillor Oliver S. Holmes, and a telegram was read which had been sent by the Minister of Fuel and Power, in which he wished the conference all success, saying that at the present time of intense and growing industrial activity it was of the utmost importance to secure the best use of our precious resources of fuel and power. The conference was encouraging evidence that industrialists recognised their responsibilities in this matter, and the Government welcomed the interest shown by the conference in so many important aspects of the nation's fuel problem. Referring to the use of oil as an industrial fuel, the message from Mr. Geoffrey Lloyd said: 'Between now and the time when substantial contributions are made by nuclear power, it will be specially valuable to supplement our present fuel and power resources and so lighten the heavy burden which the coal mining industry now carries and must continue to carry. There is only one source from which a sufficiently massive contribution can be made, and that is oil.' The significance of this statement will not have been lost upon the gas industry.

At the opening session the Chairman said that the essence of the problem was that coal, the basic material of all industries, was becoming less readily available while the demand for it was growing. A grave responsibility rested on all engaged in coalmining to ensure that industry was able to obtain the coal it needed when it needed it. And price was as important as quantity. A few shillings a ton on the coal bill, a larger gas and electricity account, the payment of higher freight rates, plus the inevitable increase in wage demands arising from them, all these combined to provide the mathematical formula for lost export orders.

But, Mr. Flather emphasised, mere exhortations to the coal industry were not enough. An equally heavy responsibility rested with industry itself to ensure that the best possible use was made of the fuel and power available to it.

Coal Industry Problems

Sir Hubert Houldsworth, Chairman of the National Coal Board, outlined the difficulties confronting the Board. Its main problems, he said, were four: Lack of capacity, shortage of technicians, an inadequate labour force, and the many and varied difficulties of human relations. In 1945 the Reid Report had said that the task facing the industry was nothing less than the rebuilding of its productive capacity on modern lines. This it was trying to do, but there was an inevitable and long lag before the money and equipment invested began to pay off. The same report had drawn attention to a dearth of technicians. None was available from other industries; new ones had to be bred, they could not be borrowed. This, too, was a long process. It had had to try to build up its labour force in a time of full employment, and inevitably, because of the nature of the work, mining took a place at the end of the queue.

In human relations, as in capacity, the industry had inherited an unhappy legacy from the past. Price was another problem which put the mines at a disadvantage compared with other industries. Wages accounted for 62% of the cost of coal. The average for all other industries was 20% of the total cost. This left the industry very little room for manœuvre.

Sir Hubert thought that those looking for solutions would do well to concentrate on the better use of coal. Something between 9 mill. and 20 mill. tons a year were wasted. If this amount was properly used, there would be no need to import coal from abroad, nor would there be any grounds for anxiety about supplies in winter.

During the conference, the fuel problem was discussed in its broadest sense in the light of papers and addresses given by representatives of the gas, electricity, and oil industries; nor was the probable contribution to the solution of atomic energy to Britain's fuel difficulties neglected. As we have mentioned, discussion was directed to two aspects—policy and technical. In the following we present abstracts of two contributions advancing the case for the extended use, on the grounds of national economy, of the services offered by the gas industry.

Price Structure Policy

By M. S. GASKILL,

West's Gas Improvement Co., Ltd.

For the prosperity or even the continued existence of an industrial community such as Great Britain, relatively cheap fuel is essential. Apart from oil, all fuel consumption in this country is either coal or derivatives thereof. Since our coal reserves and particularly those which can be won economically are by no means inexhaustible, it is essential that the price structure of fuel as a whole shall not be such as will tend to cause wastage of the national resources.

That such wastage has occurred in the past and is still taking place is undeniable; and in this connection it is interesting to compare the fuel consumption per head of the population in Great Britain with that in other European countries. If all fuel consumption—*i.e.*, coal, oil, lignite, natural gas, and hydro-electric power—is converted into 'coal equivalent,' the consumption per head of the population in this country as compared with that in other countries is approximately as follows:—30% higher than in Belgium; 60% higher than in Scandinavia; 90% higher than in France; 90% higher than in Western Germany; 130% higher than in Switzerland; and 130% higher than in Holland.

While such figures must be regarded with circumspection, and due allowance must be made for climatic conditions and the relative extent of industrialisation and urbanisation, they indicate a considerable degree of fuel wastage in this country.

Of the total home consumption in Great Britain at the present time about 44% is converted into secondary fuels—*i.e.*, electricity 18% and products of carbonisation (gasworks and coke ovens) 26%. The remaining 56% is consumed as raw coal, of which about 32% (amounting in 1953 to 26.8 mill. tons) is used domestically.

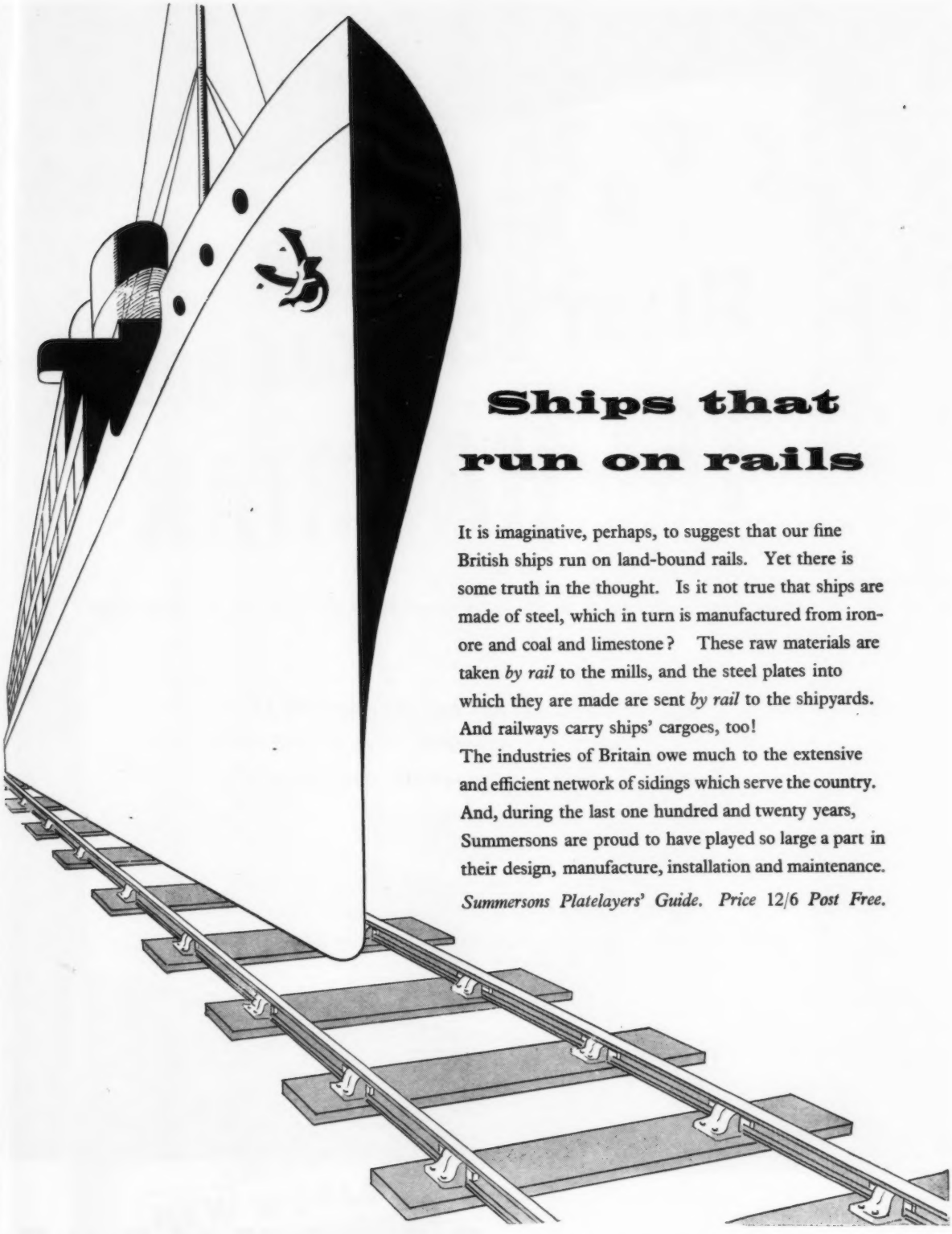
Atmospheric Pollution

There is little doubt that much of this domestic coal is consumed with a very low degree of efficiency. Moreover, this method of coal consumption has an indirect but very serious deleterious effect on national economy by way of atmospheric pollution. It is, of course, difficult to assess this factor, but, based on the Egerton Report, the present material damage probably substantially exceeds £100 mill. per annum. In the field of both efficiency and atmospheric pollution considerable improvements could be obtained by the use of derived fuels in place of raw coal for domestic purposes.

It is, however, equally important to consider the relative advantages of the derived fuels. Generally speaking, for lighting and power purposes, electricity is eminently suitable; and consideration of its efficiency on a coal basis for these uses would serve no purpose.

Let us consider, however, the application of derived fuels for heating. According to data given in the Report of the Ridley Committee on National Policy for the Use of Fuel and Power Resources the combined electricity production and distribution efficiency was 19.5%, while the corresponding figure for combined gas production and distribution efficiency was 48.4%. The latter figure is related to gas only. If the thermal value of the by-products of carbonisation are taken into account the total thermal value of the products represent over 72% of the thermal value of the coal used.

It might be submitted that the apparently greater efficiency of production of one form of derived fuel might be offset or even negatived by the relative efficiencies of utilisation. Much has been said and written on this subject; and I will limit myself to quoting the results of the Building Research Station investigations where it was shown that the annual coal equivalent of a complete



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Combination gas and coke ...	900-1,000 therms

This theme could be developed to considerable lengths. Summarised, it would appear that in the interests of national economy, heating loads should, wherever possible, be taken by smokeless solid fuel or gas. Continuous loads can in many cases be most efficiently met by solid fuel, preferably such smokeless fuels as coke or processed coal, and intermittent loads by gas.

It has been estimated that 40% of the electricity supplied to consumers is used for heating purposes. The transference of this heating load to solid fuel and gas would have a two-fold result. In addition to a substantial decrease in coal requirements more electricity would be available, even with existing generating capacity, for industrial power purposes.

The necessity for economising our coal requirements depends not only on the efficient use of coal and the derived fuels but also on the avoidance of the position which arises when demand for any form of fuel exceeds the supply. This condition, even if of comparatively short duration, may result in industrial paralysis and incalculable economic loss to the nation. Consideration of the capital costs involved in the production of the derived fuels shows a definite economy with gas and coke.

While the foregoing comments have been mainly concerned with domestic fuel utilisation, there exists considerable scope for improvement in the industrial field. In this connection it is of interest to note that the average cost of fuel in industry represents only about 3% of production costs. It is therefore suggested that the use of derived fuels—*i.e.*, gas and coke, although possibly more expensive, might in certain cases result in increased coal efficiency with very little effect on production costs.

Availability of Resources

It has been argued that the types of derived fuels to be used in the future must be dependent on the availability and resources of the various classes of coal available and suitable for the production of derived fuels. On this subject two comments are submitted. Firstly, that by no means all the coal available and suitable for carbonisation is at the present time so utilised and that enough carbonisation coal is available to meet considerable additional requirements provided there is substantially more blending and a general movement on the part of the carbonising industry to the use of lower rank coals. Secondly, that the future prospect of the production of increasing proportions of lower grade coals is no reason for an inefficient and naturally uneconomic use of such fuel.

Price structure of any fuel should basically be realistic to the cost of production. Generally speaking, this is the case in the carbonising industries.

Any national coal policy should be based on the use of the correct fuel for particular applications; and there should be co-operation instead of competition between the various nationalised fuel industries. It is, of course, appreciated that an increase in the cost of any fuel will lead to criticism and reaction on the part of both industrial and domestic consumers. The problem must, however, sooner or later be faced; and it is suggested that the possibility of price structures of raw coal both to the domestic market and to the derived fuel industries, together with realistic price structures of derived fuels based on efficient application, should be thoroughly examined.

Conserving Heat in Industry

By F. DICKINSON,

Industrial Gas Engineer, Sheffield and Rotherham Division, East Midlands Gas Board.

In this paper the author gave a picture of the efforts of the gas industry to promote efficiency and fuel conservation within its own sphere of gas production, distribution, and research, by collaboration with appliance makers, and by making available to users of gas and coke a fuel advisory service.

In regard to furnace operation the author emphasised that only those furnaces which are actually required for production output should be in operation. Furnaces which have been lighted and left idling are wasting fuel. This is more likely to occur where there are a number of small units than with large units, but it can happen, particularly with bench appliances such as solder pots, soldering iron heaters, etc.

The greatest fuel economy and operational efficiency will be obtained when furnaces are loaded as full as possible, commensurate with output and type of work. It is, for example, inadvisable to 'black out' a furnace by overloading it with cold material, and endeavour to achieve speed of heating and output by increasing the gas rate. This will result in a temporary stoppage of output while waiting for some of the material to reach a temperature at which it can be manipulated, with the last portion of the material left in the furnace being overheated and possibly burned. Apart from excessive use of fuel, this method is technically wrong, as the first 20% of material may be lower in temperature than desirable, punishing the dies or rolls, the next 60% may be satisfactory, and some of the remainder liable to rejection for metallurgical reasons. This can be avoided by having a furnace large enough to cope with a steady output at a lower and more suitable working temperature.

Furnace doors should be kept closed except when charging or discharging material. This is not only to prevent the ingress of cold air, but to prevent loss of heat by radiation from the heated internal refractory structure.

Value of Insulation

During the last few years there has been considerable progress in the application of insulation to furnaces, with a view to reducing fuel consumption. Insulation shows to greatest advantage with intermittently operated furnaces, where saturation of a heavy firebrick lining is unnecessary, and a minimum delay in the initial daily heating period is desirable. Due to retention of heat, a reduction of the weight of firebrick to be heated, and speed of attaining a desired working temperature, there is a primary saving in fuel at this stage, followed by a secondary saving throughout the rest of the operational period owing to a lower heat loss into the factory from the cool face of the insulation.

Where suitable, the replacement of firebrick by an appropriate thickness of high temperature insulation, backed by low temperature insulation, has provided a very effective reduction in fuel consumption. Here is an example of the need for collaborating with the manufacturers, as incorrect balance in wall structure could cause excessive junction temperatures and consequent breakdown of the materials employed. Similar care must be taken where insulation is being considered for annealing furnaces for materials having a critical time/temperature cooling cycle, since the heat retention could upset the whole balance of the cycle. Again, baths of molten metals or salts should have insulated covers where practicable, and certainly for use during the non-operational periods, for the exposed surface of the metals or salts is the greatest source of heat loss.

Cumulative Savings

The cumulative effect of a multiplicity of small fuel economies can be tremendous. It is thus essential for all concerned to concentrate on the implementation of the technical advice that is being given so widely and so freely on such an important national problem.

The incentive can clearly be economic, as, for example, in industry, where the fuel cost may be 4% of the total costs as in the steel trade, or 9% as in the glass trade. There may well be an onus on management to provide the necessary technical assistance and instrumentation to enable the greatest practicable efficiency to be obtained from plant, but it would not be enough to leave the matter there. It is equally essential to see that when instruments and controls are provided they are maintained in first-class condition, and properly applied in practice. This calls for consistent supervision by management, and interest on the part of the men on the job. If, for example, a temperature indicator zero is 20°C. low, this could mean the spoiling of some expensive material when being treated at a critical temperature. The cumulative value of the labour and fuel involved in processing this material from the raw state to the time of rejection may be considerable. The observance of other beneficial factors is within their purview, but it must be remembered that, while the operators are the key men who can make and maintain the required fuel economies, they are under the direct control of their managements, and the efforts of advisory bodies are limited to advice given in the light of experience.

COMPANY NEWS

U.G.I. ACQUISITION

The Board of United Gas Industries, Ltd., announces that it has acquired the share capital of the Dowson and Mason Gas Plant Co., Ltd., of Levenshulme, Manchester. The Board of the Dowson and Mason Gas Plant Co., Ltd., has been reconstituted with Mr. P. P. MacDiarmid, a Director of United Gas Industries, as Chairman. Mr. H. G. Wrigglesworth, the Group Financial Controller of United Gas Industries, has been elected to the Board of Dowson and Mason and Mr. L. G. A. Leonard is to continue as Director and General Manager.

GEORGE COHEN

In order to complete development plans, the directors of George Cohen, Sons and Co., Ltd., are considering the question of new finance of a medium or long-term character. An announcement, states Mr. C. M. Cohen, Chairman, in his review, covering the year to March 31 last, will be made as soon as possible. During the seven years since conversion into a public company more than £2¾ mill. has been invested in fixed assets, and expansion has necessitated a further £3 mill. for additional stocks, work-in-progress and amounts due from customers. As reported before, the dividend is maintained at 12% for the year. Comment is called for on the outstanding quality of printing and production of the report and accounts. A coloured supplement, '600 Service to Industry,' illustrates the activities of the Group.

NICO

The trading profit of the Nico Light Engineering Co., Ltd., for the year ended March 31, 1954, of £38,875, shows a decrease of £6,048 compared with the previous year. The net profit after depreciation, directors' emoluments and taxation, amounts to £8,494. The directors recommend payment of a dividend of 10% and a bonus of 10%, making 20%, less income tax. Mr. R. E. Green, Chairman and Joint Managing Director, says in his statement with the accounts that the position has improved on the previous year, and whereas in the early part of the year under review trading was extremely difficult, there are now substantial orders on the books ensuring full production for the augmented plant for the coming months.

HORSELEY BRIDGE

The Earl of Dudley, Chairman of Horseley Bridge and Thomas Piggott, Ltd., announces that the year to March 31, 1954, was another successful period, despite the much more difficult trading conditions. Sales turnover was a record. The trading profit from the group's activities amounted to £323,948 against £360,585. The Chairman said last year that competition both in the home and export markets and difficulties with steel supplies and skilled labour would make it unlikely that tonnage output of finished work would be increased. His forecast has proved correct, and although sales turnover has been greater than ever by the ability to do higher-class work, it has been necessary to work on smaller profit margins to meet the competition in a period of decreased demand. Much of the increases during the year in the cost of fuel, transport, wages and materials had to be absorbed. In spite of these higher costs the Chairman feels that there will be a tendency to lower prices during the current year. Balance-sheet figures both of the group and parent company illustrate financial strength 'which continues unimpaired.' The reduction in net value of work in progress and debtors of £60,425 and £170,852 respectively is compensated by an improvement of £173,279 in the cash position. The Chairman asks shareholders to note the substantial increase in the gross value of work in progress—£2,479,709, against £2,020,406—on which no profit has been taken. He goes on to say that the group's position continues to improve, current assets of £1,497,510 exceeding current liabilities by £1,177,047 compared with £1,087,265 last year.

Diary

Oct. 1.—WALES G.C.C. Civic Centre, Tenby, 11.30 a.m.

Oct. 1.—SCOTTISH (WESTERN) JUNIORS: Jubilee Dinner, Burlington House, Bath Street, Glasgow, 6.45 p.m.

Oct. 2.—WESTERN JUNIORS: Visit to Hollacombe Works, Torquay; 'Cast Iron Pipe Manufacture,' E. Wharton, Chief Chemist, Staveley Coal and Iron Co. Ltd., 2 p.m.

Oct. 4.—SOCIETY OF ENGINEERS: 'The Influence of Murdoch on the Modern World,' Miss Marjorie Lovell Burgess, Lectures Officer, Gas Council. At Burlington House, 5 p.m. for 5.30.

Oct. 4-8.—BREWERS' EXHIBITION, Olympia. Gas Council Exhibit.

Oct. 5.—INSTITUTION OF GAS ENGINEERS: Murdoch Memorial Lecture, Dr. Alexander Fleck (Chairman, I.C.I., Ltd.), at Royal Institution, 6 p.m. Admission by ticket only.

Oct. 5.—MIDLAND JUNIORS: Presidential Address, H. J. Reynolds, Birmingham.

Oct. 5.—SOUTH EASTERN G.C.C.: Caxton Hall, Westminster, 11 a.m.

Oct. 6.—NORTH WESTERN FUEL LUNCHEON CLUB: Annual General Meeting, Engineers' Club, Manchester, 1.30 p.m.

Oct. 8.—LONDON JUNIORS: Presidential Address, E. W. B. Dunning, North Thames Gas Board Showrooms, Edgware Road, 6.30 p.m.

Oct. 8.—MANCHESTER SECTION, I.G.E.: Visit to Clayton, Son & Co., Ltd., Leeds.

Oct. 12.—LONDON AND SOUTHERN SECTION, I.G.E.: Fourth Annual General Meeting. 'Obiter Dicta,' E. G. Stewart, 17, Grosvenor Crescent, S.W.1. 2.40 p.m.

Oct. 15.—MIDLAND SECTION, I.G.E.: Autumn Meeting, 'Breeze Burning for Steam Raising,' C. H. G. Hayward, General Manager, Stoker Works, Edwin Danks & Co., Ltd., Victoria Hotel, Wolverhampton, 11 a.m.

Oct. 15.—SCOTTISH JUNIORS (WESTERN): 'Some Aspects of Gasification,' W. L. Balmer; 'The Value of Experience in the Retort House,' J. Bostock; 522, Sauchihall Street, Glasgow, 6 p.m.

Oct. 20.—SOUTH WESTERN SECTION, I.G.E.: Annual General Meeting, Bristol.

DISCUSSION ON MR. R. J. GREGG'S PAPER—Concluded from p. 791.

meaning of service and shown them there was real competition ahead. His first impression on reading the paper was that it was a 'stand-to' or 'alert.' Mr. Gregg had shown them what electricity and coal were doing. He had asked if they would be able to sell all the gas they could make and that was the real problem they would soon have to face. At the present time they were content with what they were doing in Glasgow, but they had to look ahead. Mr. Gregg said that publicity and selling organisation had to go together as a pair, but his own view was that one must primarily have the selling organisation and then follow up with the publicity. All the publicity in the world would not sell unless they had the shops. Mr. Gregg said there had to be mutual understanding and appreciation between technical and the selling staffs, and today there was strong evidence that those on the production side were co-operating with the selling side.

Mr. Bujnowski referred to young men entering the production side, instead of the selling side of the industry, because there was more money there. He wondered if it would not be possible, instead of having mobile exhibitions, to have a mobile team of young men trained in salesmanship.

Mr. G. E. Currier said that Mr. Gregg had gone out of his way to criticise the industry and the gas engineer. In some places the criticism might be justified, but long before nationalisation there were enterprising and progressive gas engineers and managers who ran undertakings, successfully organising selling and publicity and meeting the fiercest competition possible.

In his opinion Mr. Gregg had not made one single suggestion which an enterprising manager had not used or carried out already, including selling after 6 p.m! Mr. Gregg frankly admitted he knew nothing about coke. It was time he knew that one-third of their total revenue came from coke and one-third therefore of his salary! They all knew they were up against fierce competition, and they wanted the best type of organisation they could get, including publicity and propaganda, but in putting forward his case Mr. Gregg did not need to castigate gas engineers and managers.

Mr. Gregg, replying to the discussion, said he had been asked to write a contentious paper and he had done so. If they were all happy about the load going down then he wished them good luck!

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A. R. CROFT,
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WEST MIDLANDS GAS BOARD

BIRMINGHAM DIVISION
ASSISTANT MAINS INSPECTOR—
BIRMINGHAM DISTRICT

THE person appointed must have had experience of mainlaying practice and be capable of supervising contractors' work. He should be familiar with the estimation of costs for mains and service laying to domestic consumers and industrial premises, and should have had previous experience of the testing of low and high pressure gas mains. He will be responsible to a senior Mains Inspector on a district covering approximately 50 square miles and having some 50,000 consumers.

The possession of a Higher Grade Certificate in Gas Supply is desirable.

The salary will be within Grade VII (£565-£645 per annum) of the salary scales of the National Joint Council for Gas Staffs.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, stating age, qualifications, experience and present position, together with the names of two referees, should be addressed to Mr. J. E. Wakeford, Divisional General Manager, West Midlands Gas Board, Gas Offices, Edmund Street, Birmingham, 3, to reach him within fifteen days of the appearance of this advertisement.

F. H. CUREFTON,
Secretary to the Board.

(*Classified advertisements continued on page* 806)

APPOINTMENTS VACANT (ctd.)

NORTH WESTERN GAS BOARD

THE North Western Gas Board, Fylde Group, Blackpool requires THREE FIRST CLASS GASFITTERS.

Applicants must hold the City and Guilds Full Technological Certificate in "Gas Fitting."

J.I.C. Schedule rates of pay (at present 3s. 9½d. per hour).

Applications to be received by the Personnel Officer, Fylde Group, North Western Gas Board, Princess St., Blackpool, not later than Friday, October 15, 1954.

NORTH WESTERN GAS BOARD

LIVERPOOL GROUP
DRAUGHTSMAN

APPLICATIONS are invited from suitably qualified persons for the above pensionable appointment in the Group Distributing Engineer's Office, Duke Street, Liverpool, 1, at a salary within Grade A.P.T. VI (£510-£590 per annum) according to experience. Experience in ordnance survey work would be an advantage.

Applications should be made on the official form obtainable from the Chief Personnel Officer, North Western Gas Board (Liverpool Group), Radiant House, Bold Street, Liverpool, 1, and returned to him within fourteen days.

NORTH WESTERN GAS BOARD

MANCHESTER GROUP
SENIOR INDUSTRIAL GAS ENGINEER

APPLICATIONS are invited for the above pensionable appointment at a salary within Grade A.P.T. XII (£765/890 per annum).

Applicants should have a wide knowledge of the utilisation of gas and other fuels in industrial and commercial establishments, together with considerable experience of the design, installation, and operation of industrial and commercial gas burning equipment.

Candidates should possess the Higher Grade Certificate in Gas Engineering (Supply), or other comparable qualification in mechanical engineering, chemical engineering or of the Institute of Fuel.

Detailed applications, giving the names of two referees should reach the General Manager, North Western Gas Board (Manchester Group), Town Hall, Manchester, 2, within fourteen days.

NORTH WESTERN GAS BOARD

APPLICATIONS are invited for the following pensionable appointments :—

1. DEPUTY GROUP INDUSTRIAL GAS ENGINEER—SOUTH LANCASHIRE GROUP (*Commencing salary of £900 per annum*).
2. DEPUTY GROUP INDUSTRIAL GAS ENGINEER—WIRRAL GROUP (*Salary within Grade A.P.T. XII—£765-£890 per annum*).

Applicants should have a wide experience in the operation and design of industrial gas appliances or have considerable experience in heat process work and a knowledge of the application of gas and other fuels in industry.

They should be corporate members of the Institution of Gas Engineers, or hold a suitable technical qualification or University Degree.

Detailed applications, giving the names of two referees, should be sent within fourteen days to the General Manager, North Western Gas Board (South Lancashire Group), Radiant House, St. Helens, in respect of the first vacancy : and to the General Manager, North Western Gas Board (Wirral Group), Hind Street, Birkenhead, in respect of the second vacancy.

EASTERN GAS BOARD

CHELMSFORD GROUP

VACANCIES exist for the following in the Chelmsford Group (Ipswich Division) of the Eastern Gas Board.

BURNHAM-ON-CROUCH DISTRICT

Qualified first-class Gas Fitter. Full J.I.C. rate (Provisional "B") and conditions of service. Married man preferred. Newly decorated modern flat available at moderate rent.

HALSTEAD AND HEDINGHAM DISTRICTS

One first-class Gas Fitter and one Service Layer are urgently required to operate in the above Districts of the Chelmsford Group. Full J.I.C. rates of Pay (Provisional "B") and conditions of service. Person qualified to undertake both gas fitting and service laying would be considered. Single man preferred, as accommodation at the moment is difficult, although a house *may* become available at some future date.

Applications in writing for the above vacancies should be addressed to F. N. Howes, Esq., Group Manager, Chelmsford Group, Gas Works, Chelmsford, Essex, stating age, qualifications and enclosing *copies* of references and should reach him not later than October 2, 1954.

SOUTH WESTERN GAS BOARD

BRISTOL/BATH DIVISION
TECHNICAL ASSISTANTS

APPLICATIONS are invited for the above appointments (three vacancies) at Works in Bristol or Bath. Salaries will be in accordance with Grade A.P.T. V—£480-£560 per annum.

Candidates should have good knowledge and experience of gas manufacture.

Successful applicants will be required to pass a medical examination and to join the Board's Staff Pension Scheme when eligible.

Applications should be received by the undersigned not later than Monday, October 11.

CHARLES R. INGHAM,
Production Engineer and Manager.

Bristol/Bath Division,
Radiant House,
Bristol, 1.

SOUTH WESTERN GAS BOARD

BRISTOL/BATH DIVISION
DIVISIONAL TECHNICAL ASSISTANT
(PRODUCTION)

APPLICATIONS are invited for the above position. The salary will be in accordance with Grade A.P.T. IX—£635-£735 per annum.

The duties will include investigation of special problems and projects throughout the Division, and acting as Works Technical Assistant whenever and wherever necessary. Candidates should be Associate Members of the Institution of Gas Engineers, or hold equivalent qualifications, and have had considerable experience in gas manufacture.

Successful applicants will be required to pass a medical examination and to join the Board's Staff Pension Scheme when eligible.

Applications should be received by the undersigned not later than Monday, October 11.

CHARLES R. INGHAM,
Production Engineer and Manager.

Bristol/Bath Division,
Radiant House,
Bristol, 1.

SOUTH WESTERN GAS BOARD

BRISTOL/BATH DIVISION
TECHNICAL ASSISTANTS :
STAPLETON ROAD WORKS

APPLICATIONS are invited for the above positions (two vacancies) at salaries in accordance with Grade A.P.T. VIII—£605-£685 per annum.

Candidates should preferably be members of the Institution of Gas Engineers, or hold equivalent qualifications, and must have had considerable experience in gas manufacture. Good mechanical knowledge and experience will be an advantage.

Successful applicants will be required to pass a medical examination and to join the Board's Staff Pension Scheme when eligible.

Applications should be received by the undersigned not later than Monday, October 11.

CHARLES R. INGHAM,
Production Engineer & Manager.

Bristol/Bath Division,
Radiant House,
Bristol, 1.

SOUTH WESTERN GAS BOARD

TECHNICAL ASSISTANTS ON
AREA SCIENTIFIC STAFF

APPLICATIONS are invited from qualified TECHNICAL ASSISTANTS and GAS WORKS CHEMISTS for the above vacancies of which there are two.

The persons appointed will be based at the Area Scientific Headquarters, Bristol, under the control of the Area Scientist, and they will be required to visit Works in the Area for varying periods of time. Their duties will consist primarily of working in co-operation with the Technical Staff at the Works they may be visiting in connection with Retort House control, Fuel Efficiency, Purification and other technical investigations which may be required. The possession of the Higher Grade Certificate of the Institution of Gas Engineers in Gas Engineering (Manufacture) or an equivalent Chemical qualification is necessary.

The salary for the posts will be within Grade A.P.T. X of the Salary Scales of the National Joint Council for Gas Staffs (£690-£790 per annum) according to the experience and qualifications of the successful applicants.

The successful applicants will be required to pass a medical examination and to join the Board's Pension Scheme.

Applications stating age, qualification and giving particulars of training and experience, together with the names and addresses of two referees, should be sent to The Area Scientist, South Western Gas Board, Area Scientific Headquarters, Canons' Marsh Gasworks, Bristol, 1, not later than October 14, 1954.

September 21, 1954.

GAS TECHNICAL ASSISTANT wanted for laboratory of Falkirk Works engaged on the development and testing of domestic and catering gas cooking equipment and gas space heating appliances. Good opening and prospects for young man with good education who has finished military service. Some previous experience an advantage. Good salary to suitable man. Address, stating age, experience, school and technical training, to No. 215, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

EAST MIDLANDS GAS BOARD

LEICESTER AND NORTHANTS DIVISION
RESIDENT DISTRICT FITTER—
IBSTOCK, LEICESTERSHIRE

APPLICATIONS are invited from FIRST CLASS GASFITTERS for the position of Resident District Fitter at Ibstock. The rate of pay is 3s. 9½d. per hour.

The person appointed will be required to deal with all district gasfitting work including attention to emergency calls outside normal hours.

A house is available for the successful candidate, subject to the terms of a Service Occupation Agreement, the inclusive weekly sum payable being 10s.

Applications stating age and experience, and giving the name of a referee should be addressed to reach the undersigned not later than October 7, 1954.

H. B. TAYLOR,
Divisional General Manager.

Gas Offices,
Millstone Lane,
Leicester.
September 15, 1954.

EAST MIDLANDS GAS BOARD

RELIEF SHIFT SUPERINTENDENT—
LINCOLN

APPLICATIONS are invited for the position of RELIEF SHIFT SUPERINTENDENT at the Bracebridge Works, Lincoln. The grade for the post is A.P.T. V (£480/£560 per annum) commencing salary being according to age and experience.

Possession of a technical qualification and knowledge of Woodall-Duckham C.V. retorts will be an advantage.

The position is pensionable and the successful candidate may be required to pass a medical examination.

Applications stating age, qualifications, present position and experience, together with the names of two referees, should be addressed to the undersigned to be received not later than Monday, October 11, 1954.

B. CLARKE,
Divisional General Manager.

Belle Vue House,
Carline Road,
Lincoln.

EAST MIDLANDS GAS BOARD

LEICESTER AND NORTHANTS. DIVISION
TECHNICAL ASSISTANT (DISTRIBUTION)—
NORTHAMPTON GROUP

APPLICATIONS are invited for the position of TECHNICAL ASSISTANT to the Group Distribution Engineer at Northampton.

Applicants must at least hold the Ordinary Grade Certificate in Gas Engineering (Supply), should have a thorough knowledge of modern methods of distribution, including high and low pressure systems, and be capable of carrying out the detail work in connection with the planning and estimating of new work.

The commencing salary will be within Grades A.P.T. V/VI of the National Salary Scales (min. £480, max. £590) according to age and experience.

The post is pensionable and the successful applicant may be required to pass a medical examination.

Applications, stating age and experience and giving full details of training and qualifications, together with the names of two referees, should be addressed to arrive not later than Tuesday, October 12, 1954.

H. B. TAYLOR,
Divisional General Manager.

Millstone Lane,
Leicester.
September 25, 1954.

NORTH EASTERN GAS BOARD

APPOINTMENT OF
GROUP COKE OFFICERS

APPLICATIONS are invited for the appointment of a GROUP COKE OFFICER in each of the six Groups of the Board. These positions will entail direct responsibility to the Group General Manager for the development of coke and breeze sales within each Group, and for the marketing of coke and breeze in accordance with the Board's policy.

The appointments will be graded either A.P.T. X (£690-£790) or A.P.T. XI (£715-£840) (Provincial 'A') of the salary scales agreed by the National Joint Council for Gas Staffs, according to the ability and experience of the applicant.

The successful candidates will be required to pass a medical examination, and to participate in the Board's Staff Pension Scheme.

Applications stating age, education and experience, and preference for the Group in which the applicant would like to be employed, should be received by the undersigned not later than October 9, 1954.

J. C. GARDNER,
Secretary.

Bridge Street,
Leeds, 2.
September 24, 1954.

THERE'S A CALL FOR MORE BOOSTERS

IT WILL PAY TO SPECIFY HOLMES-CONNERSVILLE

W. C. HOLMES & CO. LTD.

HUDDERSFIELD • LONDON • BIRMINGHAM

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TYPE 3 MIXTURE CONTROLLER

for accurate control of air blast systems

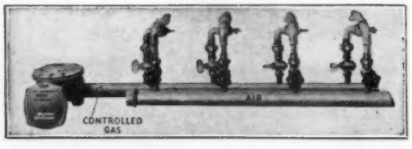
The Type 3 is the latest development in mixture controllers. Its function ensures exact proportioning of air and gas over a wide range of volumes despite the slightest variation of pressures.

Air pressures between ¼ lb. and 1 lb. are used normally but in special instances up to 2 lb. can be used.

Of robust unit construction, the assembly consists of a diaphragm valve, monitor governor and an injector which can be set in any one of four standard positions on site.

The Type 3 mixture controller is available in four sizes 1", 1¼", 1½" and 2". Write or 'phone now for particulars.

The Type 3 zero governor is a modification of the controller. Providing individual control of burners, it gives greater effective control of heat distribution, facilitates burner ignition and has greater sensitivity and range than previous types.



INDUSTRIAL GAS EQUIPMENT

Keith Blackman Ltd
MILL MEAD ROAD, LONDON, N.17
TEL: TOTTENHAM 4522 (12 LINES)

If air blast arrangements are not already installed a K.B. High Pressure fan will provide, as a rule, greater efficiency and economy than a positive blower or compressor of equal capacity. These fans may be supplied with or without K.B. made motors as required.

601

ave time and cost . . .

Specially designed for the Gas Industry, M B L Capillary Fittings ensure a quicker, efficient and permanent joint. A full range of fittings from ⅛" diameter are always in stock. Made to B.S.S. 864 for Capillary joints. All Copper Tubing is made to B.S.S. 659 and specially suitable for use with M B L fittings. Write for details.

. . . with MBL COPPER TUBES AND CAPILLARY FITTINGS

THE MINT, BIRMINGHAM, LTD., BIRMINGHAM, 18.
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WEST'S

CARBONIZING SYSTEMS

WEST'S GAS IMPROVEMENT CO. LTD

OFFERS:—

GLOVER – WEST

CONTINUOUS VERTICAL RETORTS

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INTERMITTENT VERTICAL CHAMBERS

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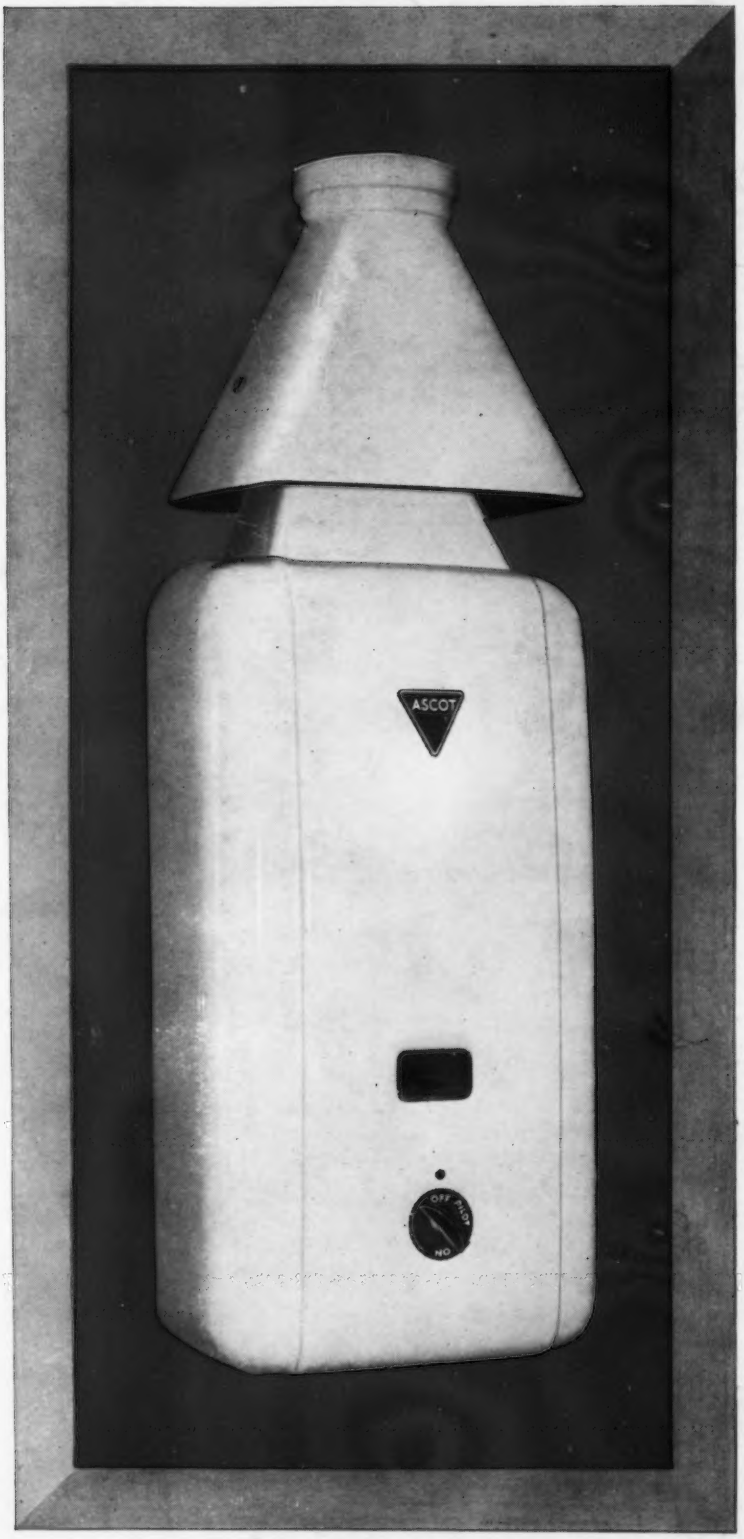

New!

An elegant one-piece case with a panelled front now gives greater dignity to the famous Ascot 709 and 709B multipoint water heaters. The new case is also easier to keep shining bright, for it is of deep-drawn steel without any joins, and is vitreous enamelled all over to present an unbroken surface that time cannot tarnish. The change is only to appearance; mechanism, operation and high efficiency are unaltered.
An advantage that fitters will appreciate is that removal of the one-piece case gives free access to all parts of the heating body.

*

A similarly panelled one-piece case is now also fitted to the Ascot SG32/1 bath water heater.

ASCOT

always lead

ASCOT GAS WATER HEATERS LIMITED • 255 NORTH CIRCULAR ROAD • LONDON NW10

WHG/A105